CONSTRUCTION OPERATIONS MAINTENANCE

B 647160

PIPE LINE INDUSTRY

APRIL
1957

ONE COPY SENT TO

CONGRESS
SERIAL RECORD
MAY 3 1957
Copy

COMMUNICATIONS SPECIAL REPORT

Air Conditioners Cut Tube Usage 10% ... 36

Microwave Test Panel 'Shrinks' System ... 38

Electronic 'Snooper' Arrests Surges ... 41

VHF Controls Borneo Sea Loading Lines ... 44

NEW METHOD

Dual Gas Lines Cross Rio on Dry Bed ... 49

STAY ALIVE

Spring Wakes Up Snakes—Watch Out! ... 54

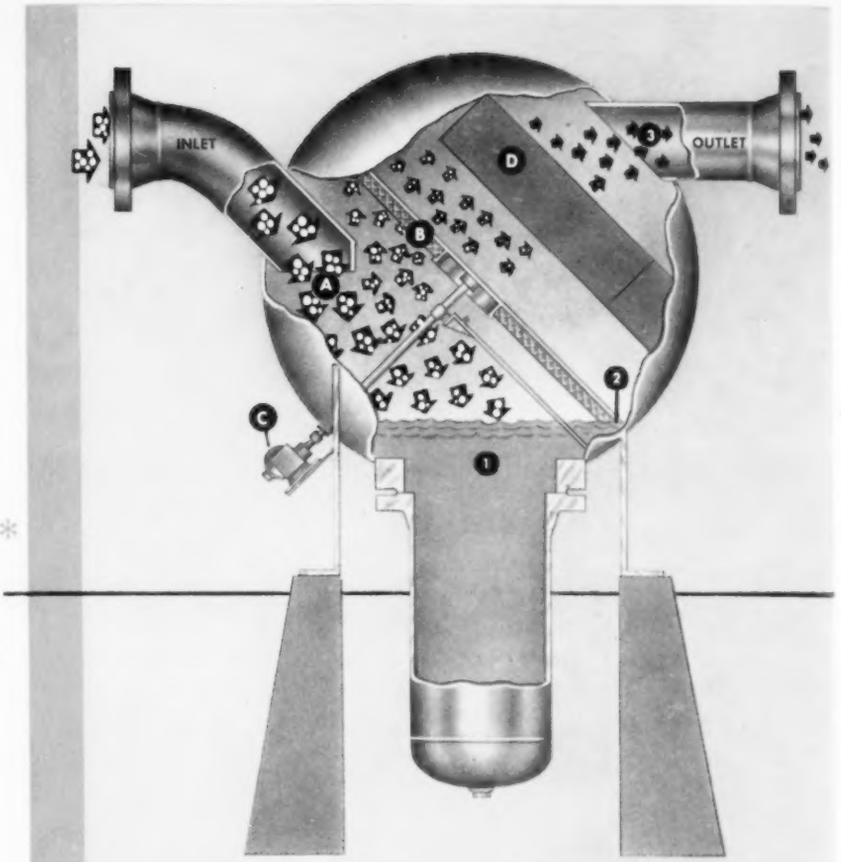
For a "Quick Look" at this issue, turn the page . .

SUBSCRIPTION PRICE $3 PER YEAR
SINGLE COPY PRICE 50 CENTS

MORE EFFICIENT RESULTS!

PEERLESS SCRUBOSPHERE*

*Spherical scrubber for dust and liquid removal from gas flow

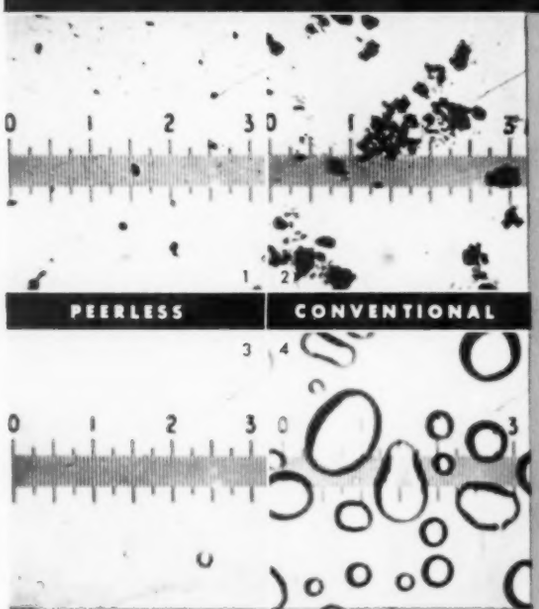


(A) The majority of incoming liquid and solid particles are directed down into reservoir. 1

(B) Lighter solid particles carried by gas stream are separated on surfaces of contactor which are kept wet and clean by revolving through liquid reservoir. 2

(C) Contactor is revolved by explosion-proof gear motor.

(D) Mist Extractor removes any remaining liquid particles from gas stream prior to outlet. 3



These photographs were made of microscope slides introduced downstream of the Scrubosphere and a conventional vertical oil bath cleaner under the same operating conditions. Plates 1 and 2 show the comparative amounts of iron oxide not removed with the amounts introduced being identical. Plates 3 and 4 indicate comparative oil loss with vapor rate through the vessels being the same.

LOOK AT THIS TEST The test at the left indicates the superiority of Peerless Scrubosphere over conventional oil bath dust scrubbers. The SCRUBOSPHERE operates with no loss of efficiency at low flows, minimum liquid loss, and very low pressure drop. Other outstanding features include easy vessel access with removable self-cleaning contactor, a sump for slugs of solid or liquid particles, and minimum cost.

For detailed information write for Bulletin No. 180

PEERLESS MANUFACTURING CO.

P.O. Box 13165 Dallas, Texas

Representatives in All Principal Cities

PEERLESS MFG. CO. DALLAS TEXAS

APR 15 1957

PIPE LINE INDUSTRY

CONTENTS and Quick Look

April, 1957 Vol. 6, No. 4

To help you put first things first, scan these time-saving digests, checking ☑ those you want to read first.

Special Communications Report

Communications Leaders Meet in Houston

☐ Here is a "thumbnail" report of a high interest program planned for the 29th annual meeting of the PIEA and PESA in Houston this month. Latest developments in electronic equipment, power plants, plus communication techniques and regulation fill the four-day conclave .....Page 35

Why Transco Likes Cool Microwave Stations

☐ Dust and high ambients, two of the worst enemies of microwave equipment, are held in check by air-conditioners at 40 southern stations. Longer tube life, improved transmitter stability and high circuit availability result .....Page 36

1000 Miles of Microwave Tested from 5-Foot Desk Console

☐ You don't have to be an acrobat to check out operation of microwave system circuits. Platte Pipe Line Company's communication's engineers built a compact multiplex test console to speed routine tests and reduce field maintenance work load.

By Melvin A. Judah.....Page 38

"Snooper" Controls Compressor Surges

☐ Uncontrolled pulsating surges that may occur at centrifugal compressor stations can be a dangerous operating hazard; at remote unattended stations they could be "dynamite." Texas Eastern engineers developed and field tested an electronic device to sense dangerous pressure fluctuations; then by means of a pre-set feedback control system smooth out surges before they become a real hazard.

By F. Vinton Long.....Page 41

VHF Controls Sarawak Sea Loading Operations

☐ Pumping products from the Lutong refinery terminal to four tanker berths located 3½ miles offshore demands quick communications both for normal control and emergencies. Portable radio units are taken aboard tankers by the boarding pilot. Each has an emergency coded pump control signal; in event of delivery line burst, pressure surge or other hazard, tankers can instantly shutdown pumps .....Page 44

Pipe Line Crosses Rio Grande on Dry Ground

☐ Texas Eastern Transmission Corporation's new line takes in rugged terrain and expanses of water. Here are the details on the dry-ground laying of dual 20-inch lines across the Rio Grande.

By Ralph C. Hughes, Jr......Page 49

How to Guard Against and Treat Snake Bites

☐ With Spring here, the ever-present hazard of poisonous snakes should be brought to the attention of all pipe line field men. This summary of important safety precautions will help reduce painful injuries and costly lost time .....Page 54

Aramco Whips "Sabkhahs" on Ras Tanura Line

☐ "Soon to be completed" line has taken a variety of hurdles. Here is the story of how contractors overcame supply difficulties brought on by the Suez hostilities and unusually tough terrain conditions. Part of line is submarine; but 28 miles of the 22-inch line will be supported on piling across the Arabian sabkhahs or salt flats.

By H. T. Brundage.....Page 60

20 Guides to Efficient Buying

☐ Just one useful timesaver applied to a busy buying day can make your job easier and your value to your company immediately more evident. Here are 20 time-saving ideas designed to help purchasing agents and salesmen in their work. Check these suggestions and see how many you are now using.....Page 64

REGULAR MONTHLY DEPARTMENTS

Editorial Page	4
Pipe Line Panorama	33
If Oil Could Speak	34
Rule of Thumb	85
Construction News	68
Pipe Line Hints	86
Personals	98
Who's Meeting Where	104
Suppliers' Notes	107
Classified Advertising	113
What's New in Equipment	114
New Equipment Catalogs and Literature	121
ADVERTISERS' INDEX	122

PIPE LINE INDUSTRY published every month. Entered as second class mail matter July 9, 1954, at the post office at Houston, Texas, under the act of March 3, 1879.

Free Competition Results in Fast Action

Recent activities of U. S. pipe line companies constitute another example of the characteristic that makes the American privately-owned and free competitive business system such a highly efficient operation.

The Suez Canal crisis proved U. S. pipe line capacities were insufficient to move enough oil from inland producing areas to coastal shipping centers in times of national emergency.

•

Steps are being taken already by private U. S. business to overcome the deficiency.

It is important to remember the shortage was demonstrated by developments which have occurred since last November. In the short time since, decisions have been made, money allocated and action already set into motion on several major construction programs.

No government could match such speed. Government owned or controlled business would not be able to move so swiftly. It would have to take time to study and debate the issue. Political considerations would have to be overcome and more often than not they would merely cloud the logical, practical facts upon which a decision should be based.

In contrast, free competition necessitates that action be taken quickly. Otherwise, some competitive organization will take the initiative, thereby gaining a jump on its competitors by gaining entry to a market. The organization that gets to a market first is difficult to dislodge.

•

A big increase in capacity of pipe lines from two inland U. S. areas with large surplus producing ability will be constructed in the immediate future. They will overcome the shortage in U. S. pipe line capacity that was demonstrated by the sudden call for much larger quantities of U. S. crude as a result of the closing of the Suez Canal.

Survey work already has been started on a 600-mile line from the Four Corners area to Los Angeles, with completion scheduled by the end of 1957. This is a cooperative venture of a group of companies. Initial capacity will be 60,000 barrels daily, but with additional pumps can be increased to 160,000 barrels per day.

Texas-New Mexico Pipe Line Company will soon begin construction of a 515-mile 16-inch 50,000 barrel-per-day line from Four Corners to the company's West Texas system.

Magnolia Pipe Line Company will enlarge its West Texas to Gulf Coast capacity to 75,000 barrels per day.

Still another line in the planning stage is Northwest Pipe Line's program to build from Four Corners to Salt Lake City.

A group of companies has made plans for a 400,000 to 500,000-barrel crude line from West Texas to the Gulf Coast. Unfortunately, inability of steel mills to deliver pipe apparently will delay the project several years.

•

More oil will be available as a result of the foregoing events when the next national emergency strikes. These plans to overcome the pipe line shortage constitute a record of achievement that can be expected only of a privately-owned highly competitive business system.

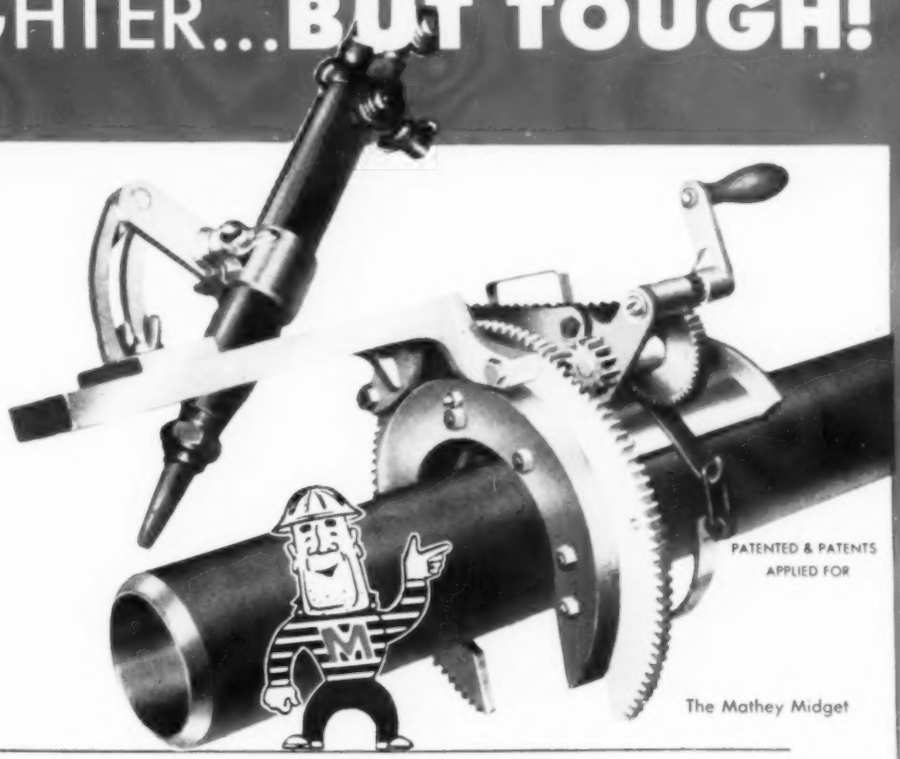
Where free competition reigns, individual companies must act swiftly to gain valuable business advantages ahead of their competitors. This works wonders in safeguarding U. S. national security, providing capacities and other advancements that would not occur under cartel, monopolistic or government controlled business conditions.

Free business competition is America's greatest national security asset.

THE Mathey TWIN!

IT'S LIGHTER...BUT TOUGH!

FOR SPEED,
ACCURACY,
DEPENDABILITY,
SERVICE AND ECONOMY
—IT'S MATHEY



The Mathey Midget

COMPLETE RANGE OF SIZES
FOR BEVELING & CUTTING PIPE FROM 1½" to 36"

Constructed of aluminum, treated with special hardening process. Approximately 41% lighter providing fatigue free durable performance. Designated as Series L, it's available in No. 3-L, No. 4-L and No. 5-L. For the lightest Pipe Cutting and Beveling Machine available, try the Mathey Twin, Series L.

The regular rugged Standard Models are available in the Midget, No. 1, No. 2, No. 3, No. 4, and No. 5. You can't beat field-tested Mathey Pipe Cutting and Beveling Machines for accuracy, speed and economy.

Also featuring these other field tested Mathey Products:

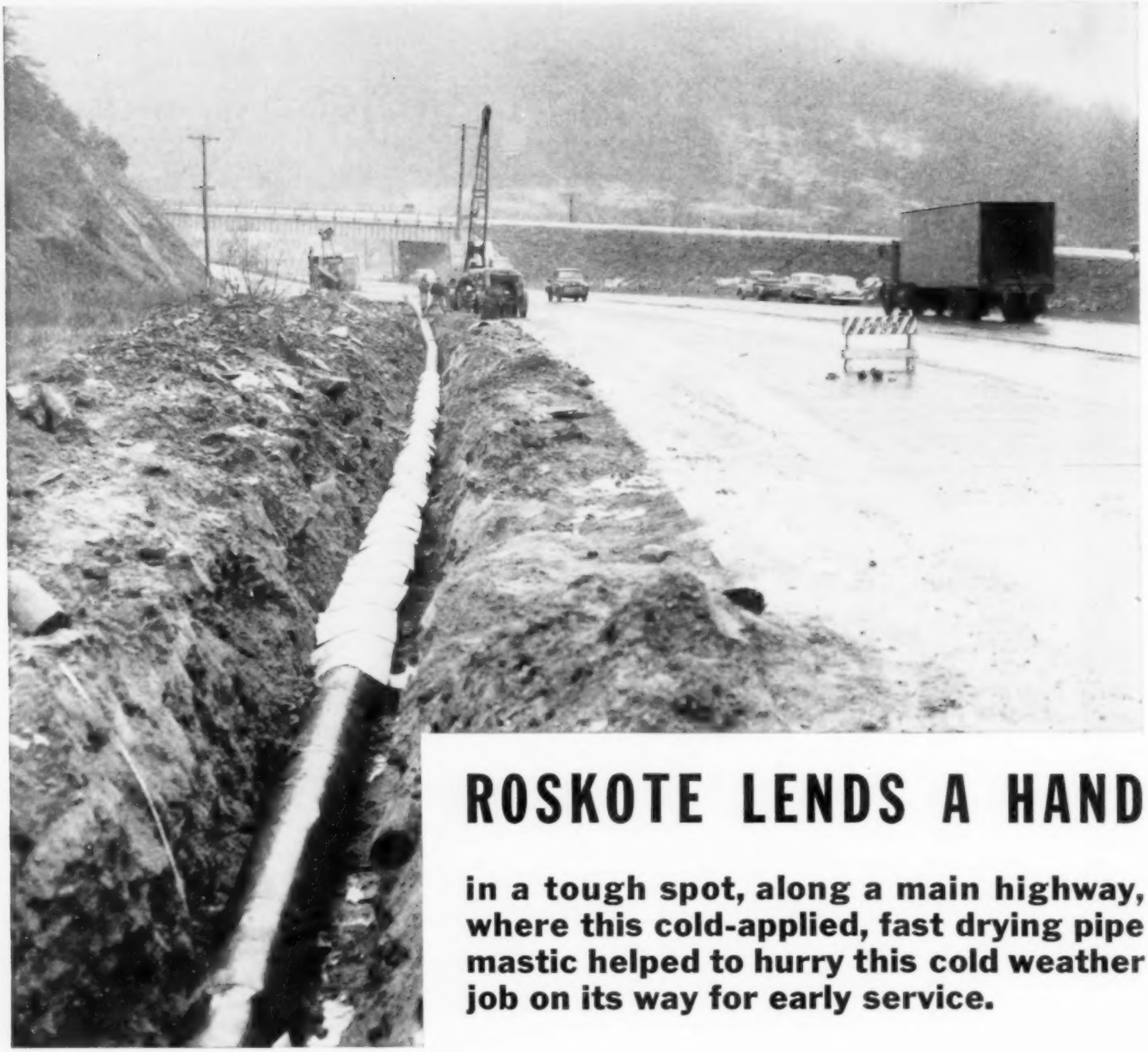
- SHAPE CUTTER
- COUPON CUTTER
- OUT-OF-ROUND ATTACHMENT
- FLANGE LINE-UP PINS
- MAGNETIC CIRCLE CUTTER
- MAGNETIC STRAIGHT EDGE

SEE OUR CATALOG IN THE COMPOSITE CATALOG

Call or write today for fully illustrated information on the complete Mathey line.

C. A. Mathey MACHINE WORKS, INC.
212 SO. FRANKFORT TULSA, OKLA. • PHONE Diamond 3-3623

ORIGINAL ENGINEERS AND MANUFACTURERS OF ALL SADDLE-TYPE PIPE CUTTING AND BEVELING MACHINES



ROSKOTE LENDS A HAND

in a tough spot, along a main highway, where this cold-applied, fast drying pipe mastic helped to hurry this cold weather job on its way for early service.

A large portion of Equitable Gas Company's 18½ mile "Delmont Line" of 16" pipe, was laid 3 feet from the edge of U.S. 22. Cold application of Roskote was ideally suited because of limited working space and it accelerated completion of the line. The pipe was given two coats of Roskote Cold Applied Pipe Mastic and a wrapping of felt. Pipe line padding was used where undesirable backfill was present. For complete information on Roskote, with its high resistance to electrolytic and chemical corrosion, write:

ROYSTON LABORATORIES, Inc., Box 112-D, Blawnox, PITTSBURGH 38, PA.

District Sales Offices:

P. O. Box 1084
Atlanta, Georgia

P. O. Box 1753
Tulsa, Oklahoma

P. O. Box 8188
Houston 4, Texas

P. O. Box 21
Park Forest (Chicago), Ill.

3114 Midvale Avenue
Philadelphia 29, Pa.

Overton Sales Equipment Co.
5981 Fairmount Extension
San Diego 20, Calif.

Warehoused in North East, South East, South Central and North Central Regions

Manufacturers Of: Roskote Pipe Mastics • Roylac Aluminum Finish • Oil and Gasoline Resistant Mastics • Vinachrome Primer • Orco Insulation Tape • Roybond A-36 Adhesive • Aluminum Mastic • Pipe Storage Primers • Roskoter Coating Device • Royston Glass Wrap • Endseals

Distributors Of: Polyken Tape • Dow Magnesium Anodes • Pipeline Felt • Glass Pipe Wrap • Pipeline Padding

PIPE LINE INDUSTRY

Specialized oil publications of **THE GULF PUBLISHING COMPANY**, 3301 Buffalo Drive, Houston 19, Texas; Box 2608, Houston 1, Texas. Cable Address: GULFPUBCO.

PIPE LINE INDUSTRY and the PIPE LINE COMPOSITE CATALOG (first edition to be issued in July, 1957) for the oil and gas pipe line industry.

WORLD OIL and **THE COMPOSITE CATALOG** for the drilling-producing-pipe line industry.

PETROLEUM REFINER and **THE REFINERY CATALOG** for the refining-natural gasoline-petrochemical industry.

RAY L. DUDLEY, President, Publisher

TOM W. NELSON, Vice President-General Manager

R. M. deSOMBRE, Vice President-Ass't. Gen. Mgr

WARREN L. BAKER, Vice President

•

EDITORIAL

Warren L. Baker, Editorial Director; Melvin A. Judah, Editor; Wallace Fitzgerald, Managing Editor; Ralph C. Hughes, Jr., Cecil W. Smith, Don Kliewer, Don E. Lambert, Associate Editors; Jack Cockerham, Presentation Editor.

District Editors: Harrison T. Brundage, 250 Park Ave., New York 17; Gilbert M. Wilson, W. W. Wilson Building, Huntington Park, Calif., and Anthony Gibbon, Enterprise Building, Tulsa 3, Okla.

Editorial Assistants: Mary Stuart Warren, Margaret McKenzie, Beverly Drawe.

Librarian: Eunice Okoneski.

ADVERTISING

D. S. Craig, Advertising Sales Manager. *Representatives*: NEW YORK (17): Nelson Bigelow, Gene Hart, George Skelton, 250 Park Ave., **Phone YUkon 6-6558; CLEVELAND (15)**: Bill Westfall, Harvey Dunn, 1010 Euclid Ave. Phone MAin 1-3295; CHICAGO (4): H. G. Fitzpatrick, Martin Halloran, 332 So. Michigan Ave., Phone Wabash 2-9330; LOS ANGELES: Jay Curts, W. W. Wilson Bldg., Huntington Park. Phone Ludlow 7-1219. TULSA (3): Jim Isaacks, 916 Enterprise Bldg., Phone CHerry 2-9211; DALLAS (2): Ed Thompson, Santa Fe Bldg., Phone RIverside 7-7344; HOUSTON (19): Charles Wyatt, William G. Dudley, 3301 Buffalo Drive, Phone JAckson 9-4301; EUROPEAN: Theodor Miocha, Agent. Limmerstrasse 31, Hannover, Germany, Phone 4-2935; UNITED KINGDOM: Frank Chambers, Agent, 120 Moorgate, London, E.C. 2. Phone Monarch 5661. Advertising rates on application.

•

SUBSCRIPTIONS

R. M. deSombre, Circulation Manager, P. O. Box 2608, Houston, Texas, U. S. A.

Single copies 50 cents (except special issues).

Double price for single copies more than a year old. Subscription price: domestic and foreign $2 a year; 2 years, $3; 3 years, $4. Subscription restricted to those engaged in the pipe line branch of the oil and gas industry, or the manufacturing and distribution of pipe line equipment.

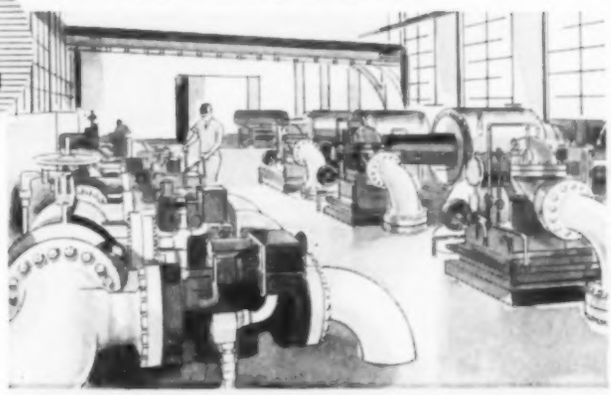
Copyright, 1957, by The Gulf Publishing Company.

Indexed by Engineering Index and Industrial Arts Index

A Solution to Pipeliner Problems

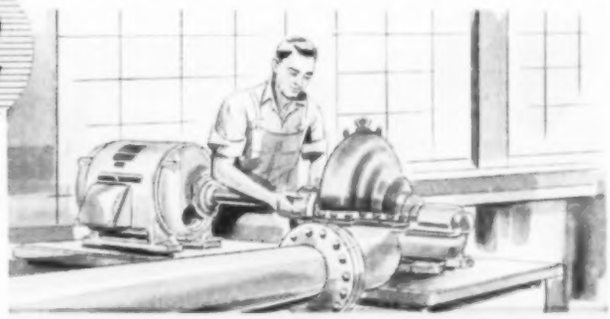
John Crane®
8-B
SHAFT SEAL

1 ON HIGH PRESSURES



Specially engineered hydraulically balanced construction permits handling of all pressures encountered in modern pipe lines Pipeliners report that 8-B Seals in continuous main line pump service for more than 44,000 hours are still in perfect working condition

2 ON MAINTENANCE MAN-HOURS

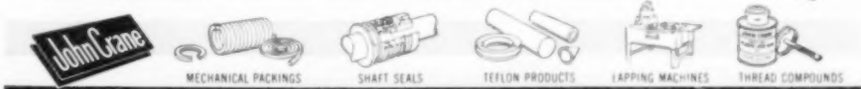


8-B Seals are quickly installed Removal of the top casing on split case pumps is not necessary. Simply slide the entire unit along the shaft into position. Once installed, little or no attention is required. Service-life is long. No messy leakage.

The 8-B Seal is available in a full range of shaft sizes for every main line or tank farm pump service.

For general information request Bulletin S-215-1. Give mechanical specifications and service details for specific recommendations.

Crane Packing Co., 6434 Oakton Street, Morton Grove, Illinois. (Chicago Suburb) *In Canada Crane Packing Co., Ltd., Hamilton, Ont*



CRANE PACKING COMPANY

CATERPILLAR ANNOUNCES

THE NEW NO. 572 PIPELAYER

—the latest addition to the pipeline field

Job-tested in the West Virginia mountains, the No. 572 lays 26-inch pipe under the roughest possible conditions.

86,000-lb. lifting capacity
Torque converter drive
Constant power drive to pipelayer winches
19-inch ground clearance
Hydraulic bottom-pivot counterweights
86-inch track gauge
Heavy-duty track rollers
Safety-engineered controls

The new CAT* No. 572 pipelayer, with its 86,000-lb. lifting capacity, is the machine you need to team up with the 130,000-lb.-capacity No. 583. Like its bigger brother, already established as the leader in the pipelaying field, the No. 572 is all pipelayer—an integrated unit of tractor chassis and pipelayer mechanism.

This pipelayer is the result of extensive field tests. With its 19-inch ground clearance and its 86-inch track gauge, the No. 572 gives you stability in any type of terrain. And it is powered by a dependable Cat Diesel Engine rated at 128 HP at 1200 RPM.

Maintenance is easy. Tracks are hydraulically adjusted so only a hand-grease gun is needed to maintain proper tension on the tracks. The box-construction center section of the pipelayer is easily removed for access to the clutch and transmission.

Operators will like its ease of operation and safety features. The No. 572 has in-seat starting. Controls are located for convenience and positioned for frequency of use. To prevent accidental dropping of the boom, the boom brake is spring loaded and requires a positive effort against the spring to release it.

The No. 572 is the newest addition to Caterpillar's full-line of equipment for pipeline spreads. It is designed for the tough jobs, wherever big-inch pipe may take you. Call your Caterpillar Dealer. He'll demonstrate it on *your* job . . . at *your* convenience.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

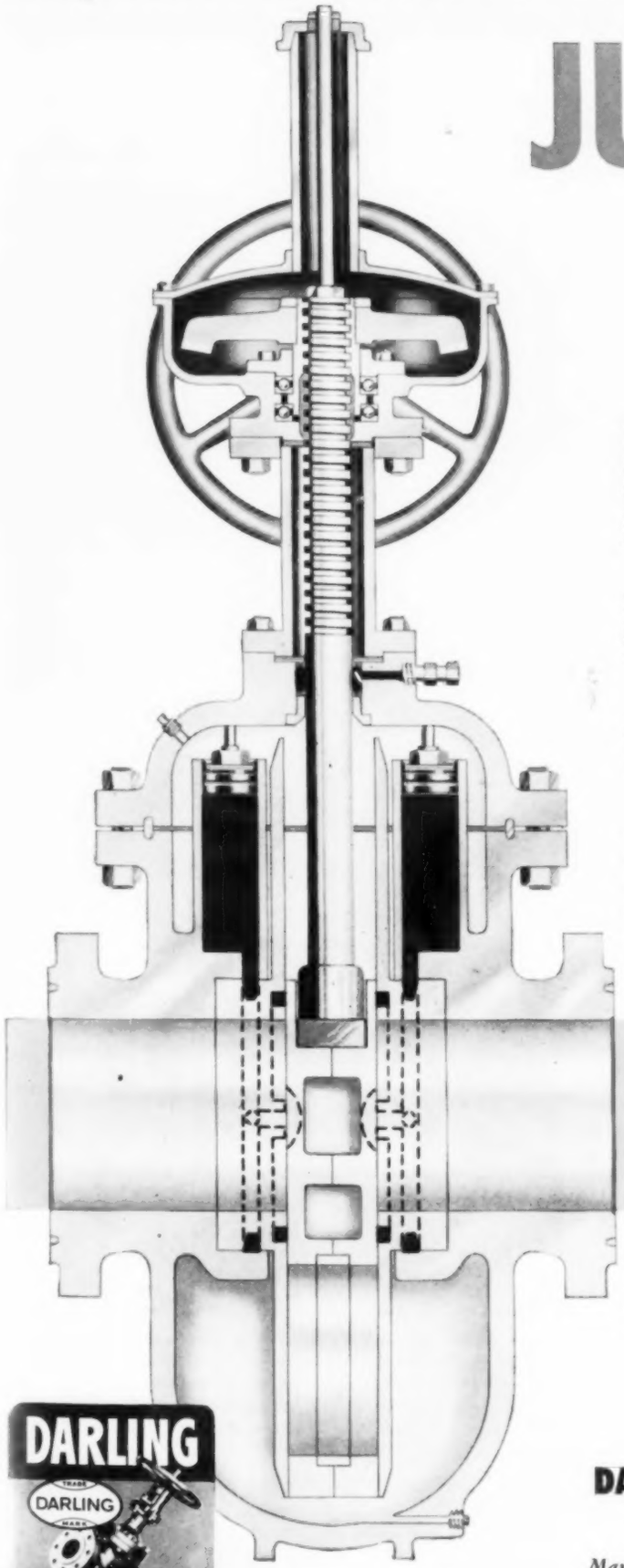
CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED—
THE HARD WORK

Why DARLING-McEVOY 2-way conduit gate valves

JUST CAN'T LEAK!



IT'S simple. Regardless of flow direction, a sealant *automatically* completes a pressure-tight seal between the downstream seat and gate. This is the inevitable result of pressure differential at the time of closure.

Similarly there can be no behind-the-seat leakage! For, as shown here, each seat is *double-grooved* to seal against the valve body as well as the gate.

It is this unique feature, with its positive, automatic self-sealing, that establishes the Darling-McEvoy conduit gate valve as the world's tightest!

Isn't it likely that you could benefit by such valve performance as time goes on? Get the *whole* story . . . get details on this and the other unusual features that make these field-proved valves truly outstanding for low-cost, trouble-free operation. Just ask for Bulletin 5402.

Section view of Darling-McEvoy 2-way conduit gate valve, showing twin sealant reservoirs, double-gate parallel seat design, and sealing grooves. Sizes: 8 inch and larger.

DARLING VALVES

DARLING VALVE & MANUFACTURING CO.

Williamsport 27, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ont.

For more data on advertised products, use Readers' Service Cards, last page.

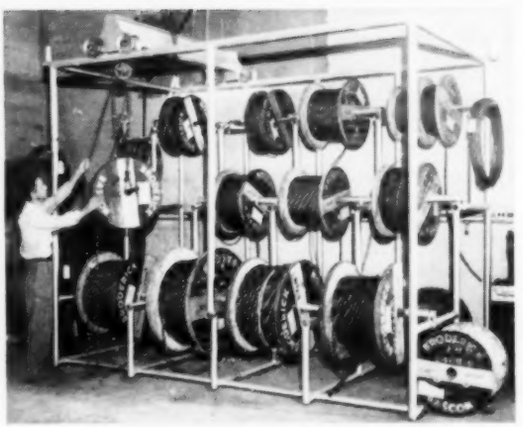
Yellow Strand... always on hand

Reels Ready to Roll When You Need Wire Rope

Stocks on hand . . . that's good to know when you need wire rope. It assures steady production on your equipment when time counts most.

There are always adequate stocks of Yellow Strand Wire Rope in the right types and sizes — conveniently near you. Yellow Strand distributors and Broderick & Bascom Warehouses are strategically located throughout the U.S.A., always ready to serve you.

High quality Yellow Strand Wire Rope, resulting from more than 80 years manufacturing experience, means long wire rope life and lower costs. Take advantage of the extra service you get from Yellow Strand — and the money-saving feature of "stocks on hand." Write for name of nearest distributor.



This is typical of many Yellow Strand distributor wire rope stocks. You have it when you need it — at nearby stores or warehouses. Experienced counsel on wire rope application is also available at your distributors or from a Broderick & Bascom sales engineer. Ask for it today.

Yellow Strand®

Manufacturers of Wire Rope for over 80 Years

BRODERICK & BASCOM ROPE CO.

4203 Union Blvd., St. Louis 15, Mo.

CREWS LIKE TO WORK WITH

Youngstown ELECTRIC WELD LINE PIPE

BECAUSE IT GIVES THEM ALL THE BENEFITS OF THE "BIG 5"

Here are the "Big 5" reasons why Youngstown Electric Weld Line Pipe is your best buy:

1. It bends readily
2. Wall thickness is uniform
3. Line up characteristics are excellent
4. Weldability is outstanding
5. Long lengths save you time and trouble

Crews, contractors and oil and gas companies all like the time- and labor-saving "Big 5" benefits of Youngstown Electric Weld Line Pipe.

Youngstown Electric Weld Line Pipe saves time and trouble because it's made in long lengths. These long lengths, of course, result in minimum handling and welding—that speeds up installation and reduces pipe line costs.

Wherever there is oil and gas to be transported, there is Youngstown to serve you.

Youngstown

ELECTRIC WELD LINE PIPE

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: - - - Youngstown 1, Ohio.

REPORT on new shovel-crane standards:
(one in a series)

BONUS FEATURES available as optional equipment on most Link-Belt Speeder models include Independent-Swing and Travel which eliminates shifting, saves 20-30 seconds each move . . . long, wide crawler base . . . torque converter . . . and reversing clutches for either or both main drums. Speed-o-Matic, the fingertip-operated, fatigue-cutting, true power hydraulic control system is standard on all models.

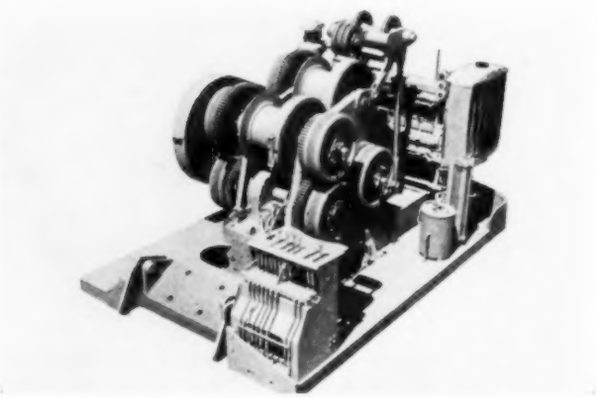
Gaining a BIG power bonus

Size for size, Link-Belt Speeder trench-hoes deliver greater usable horsepower than other machines using the same engines

Why? Because a Link-Belt Speeder is engineered for extra-structural strength to take full advantage of the engine's available horsepower and still remain well within engine manufacturers' recommended speeds. For example, Model X when run at 1200 rpm develops *75 hp* . . . at 1600 rpm it develops *100 hp!*

Thus, with a Link-Belt Speeder on your job you've got more usable power—extra power to sock the dipper into the cut, come up with a full load. And you've more power to hoist, swing and travel.

And bonus horsepower is but one of many reasons why Link-Belt Speeder owners have been able to completely revise and upgrade their standards of shovel-crane performance. Why not see your Link-Belt Speeder distributor for the complete story or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.



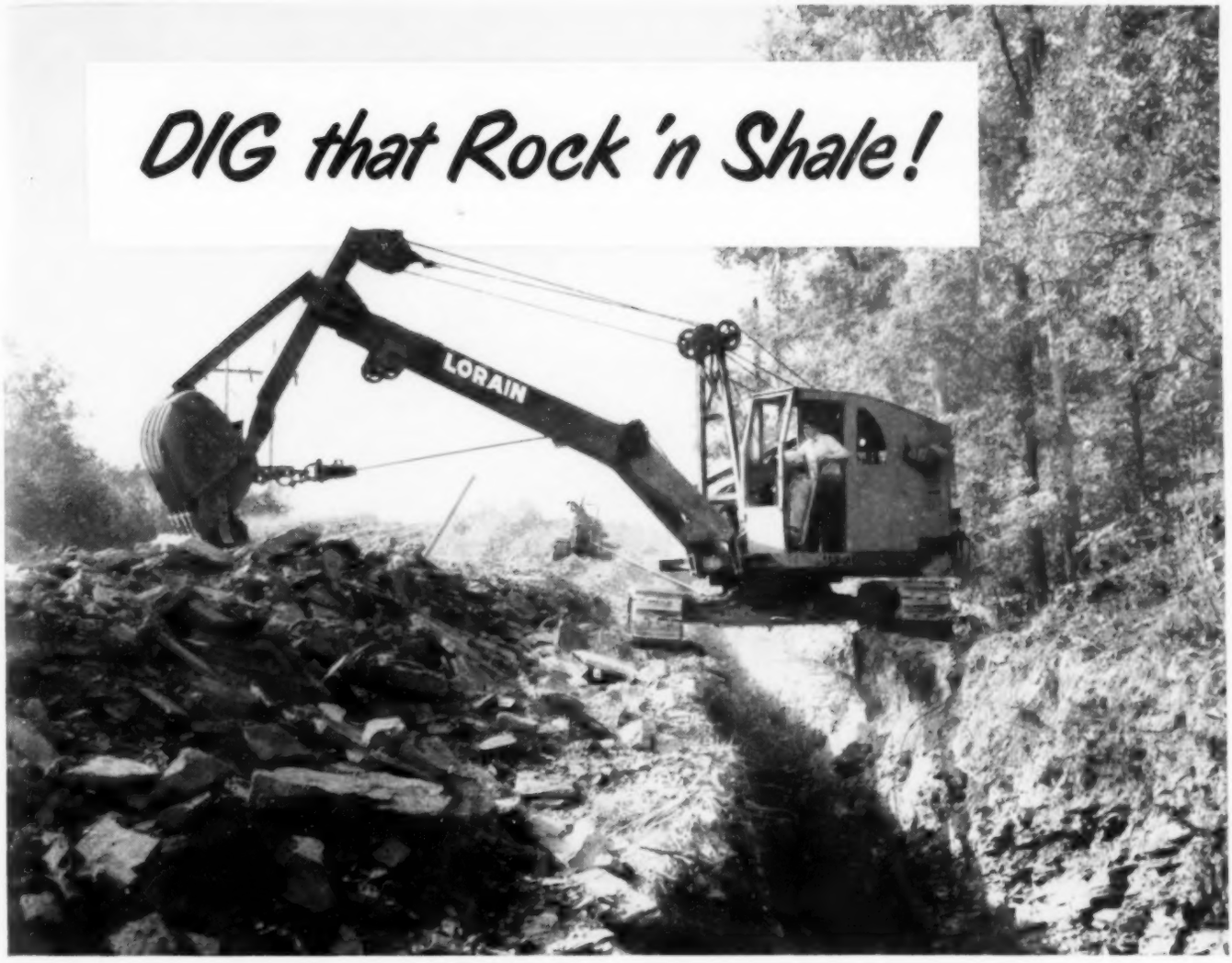
Size and strength of components

In a Link-Belt Speeder you'll find big, extra-strength shafts, clutches, gears and other components . . . units easily able to handle the extra power the machine's engine develops. Result—more production and yet lower cost of maintenance and service . . . less downtime, more work time. 14.545

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls



LORAIN "PIPELINERS" get the tough jobs!

Look at that trench! It's tough digging through rock and shale on a 17-mile stretch of 30-inch gas line in southern New York.

Tough jobs like this one go to Lorain "Pipeliners" because they put many outstanding features to work . . . for fast, powerful digging, ease of operation and real "stand-up" ability. Consider what these new design facts, available in the new Lorain-26 "Pipeliner," can mean to you: new operating ease and control with the finger tip, 2-lever, "Joy Stick-Hydra Ease" power controls; smooth digging power from a new torque converter that automatically matches digging needs; long crawler life with the big, husky crawler and heavier drive chains; long, wide crawlers for extra stability; fully-enclosed crawler propelling mechanism with sealed tread lock; flotation and ability to straddle wide trenches; smooth, free-swinging roller bearing hook rollers; sealed idler rollers for long, trouble-free life; plus a longer, heavier Hoe boom built to dig harder materials — deeper.

Be sure to get the *full* story on the Lorain-26 "Pipeliner" from your Lorain Distributor.

THE THEW SHOVEL CO., Lorain, Ohio

THEW LORAIN®

For more data on advertised products, use Readers' Service Cards, last page.

KEEP IT CLEAN... by Phil Tration

Here's a sales idea for you barbers. What customer could resist the appeal of a shampoo that's so clean even the rinse water is filtered by a Dollinger Staynew Filter? (What ridiculous application will they think of next).

This is just our way of showing you that the uses for Dollinger Filters are truly unlimited. Any liquid, gas or air can be efficiently and economically handled by them. Whether you want to protect machines or processes from damage caused by dust, dirt, oil, grease, or other foreign matter, there is a Dollinger Staynew Filter which will do the job efficiently and economically.

They are in use throughout the world...the recognized standard of quality wherever filters are used.

MODEL AAPHS ABSORPTION FILTER
Takes moisture and other foreign matter out of pipelines serving air-operated equipment and processes. The model illustrated is in use by thousands of companies saving countless dollars annually by eliminating process shutdowns. The unique Dollinger Design eliminates every trace of moisture . . . air enters filter from top; is forced down, over and around filter element. Moisture is deposited in bottom of filter even before the air finally passes through filter pads which absorb last drops of moisture or dirt. Write for Bulletin 200, Dollinger Corporation, 95 Centre Park, Rochester 3, N. Y.

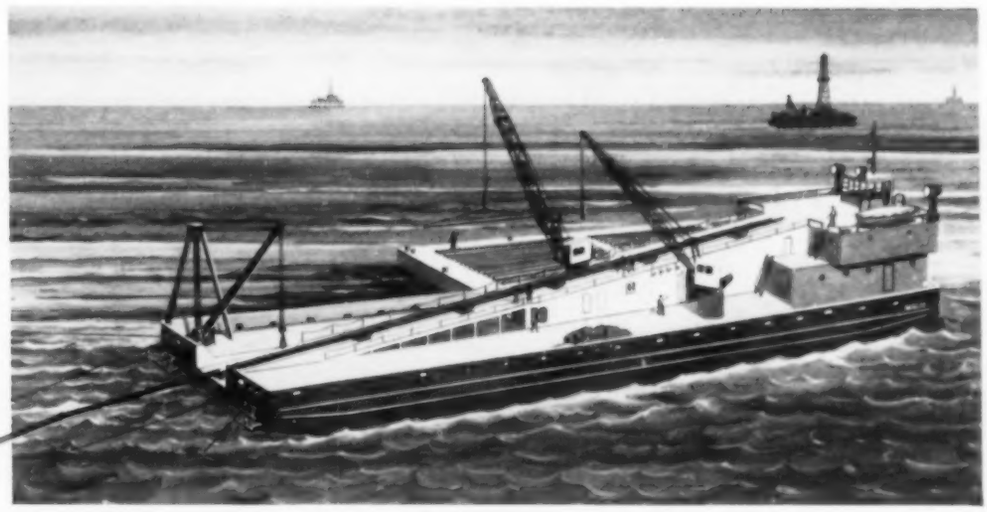
REG PROTECTOMOTOR U.S. PAT. OFF.

STAYNEW **DOLLINGER**

FILTERS

LIQUID FILTERS • PIPE LINE FILTERS • INTAKE FILTERS • HYDRAULIC FILTERS • ELECTROSTATIC FILTERS • MIST COLLECTORS • DRY PANEL FILTERS • SPECIAL DESIGN FILTERS • VISCOUS PANEL FILTERS • LOW PRESSURE FILTERS • HIGH PRESSURE FILTERS • AUTOMATIC VENTILATION FILTERS • NATURAL GAS FILTERS • SILENCER FILTERS

THE "MAGIC" MAKES ITS BOW!



FIRST BARGE DESIGNED FROM HULL TO SUPERSTRUCTURE FOR MARINE PIPELAYING...

A giant seagoing assembly line, the "Magic" is designed to join and lay from 2000 to 5000 feet of pipe per day, depending on the diameter. Heart of the "Magic" is a ramp running almost the entire length of the barge and on which each joint is welded, X-rayed, taped and coated with concrete before the finished section is allowed to settle to the bottom.

owned by **MARINE GATHERING COMPANY**

construction division of

COMMONWEALTH OIL COMPANY

Texas National Bank Bldg.
Houston, Texas

MARINE GATHERING COMPANY

HOW
International Superior TD2

give "needle-threading," spread-speeding p

Two Torque-Converter and two Gear-Drive TD-24 Sidebooms carefully swing the 70,000-lb pipe section into position (see inset view). Large view shows how two Torque-Converter and one Gear-Drive units confounded the experts—by precision-threading the 400-foot section of 34-inch pipe into position under a small gas line that crosses the right-of-way. At work on El Paso Natural Gas Company line from Four Corners and San Juan Basin fields to the Arizona-California border near Topock. Location: near Windrow Rock, New Mexico.

TD24 Sidebooms

ing precision control

—on El Paso Natural Gas Company line!

Watch this trio of International Superior TD-24 pipebooms perform with precise coordination of tractor and boom action. They're "threading the needle"—placing a 400-foot, 70,000-pound section of 34-inch pipe *under* a small old line, without even ticking the two lines together. The job: laying El Paso Natural Gas Company's new line to the Arizona-California border.

Behind this special kind of pipe-handling precision is exclusive International TD-24 Planet-Power steering. You can feed full-time live power to both tracks to turn smoothly — as sharply or gradually as desired—*without jerks!*

Exclusive TD-24 finger-tip hydraulic braking and foot decelerator help give you positive pipe-carrying control by exact regulation of tractor motion. And the International Superior sideboom provides super-fast control of boom action with slip-proof, inch-close accuracy—and with minimum operator effort, from reach-easy control lever clusters.

No wonder this crew of skilled TD-24 sideboom operators are able to "thread a needle" —installing difficult sections; saving time with accurate "butting," and accurate positioning of the huge, heavy gate valves—helping speed the whole spread from welders to backfillers!

See what precision, spread-speeding profitable performance you get from *big* International Superior *exclusive advantages.* Compare how new bonus-powered International Superior TD-18, TD-14, and TD-9 sidebooms also outperform any other units in their size classes. See your International Construction Equipment Distributor for a demonstration of the boom and tow equipment you need!

For bending on this El Paso Natural Gas Company line, a CRC cable bending machine, powered by an International U-264 engine was used. The 34-inch pipe in 40-foot lengths each weigh 7,000 lbs.

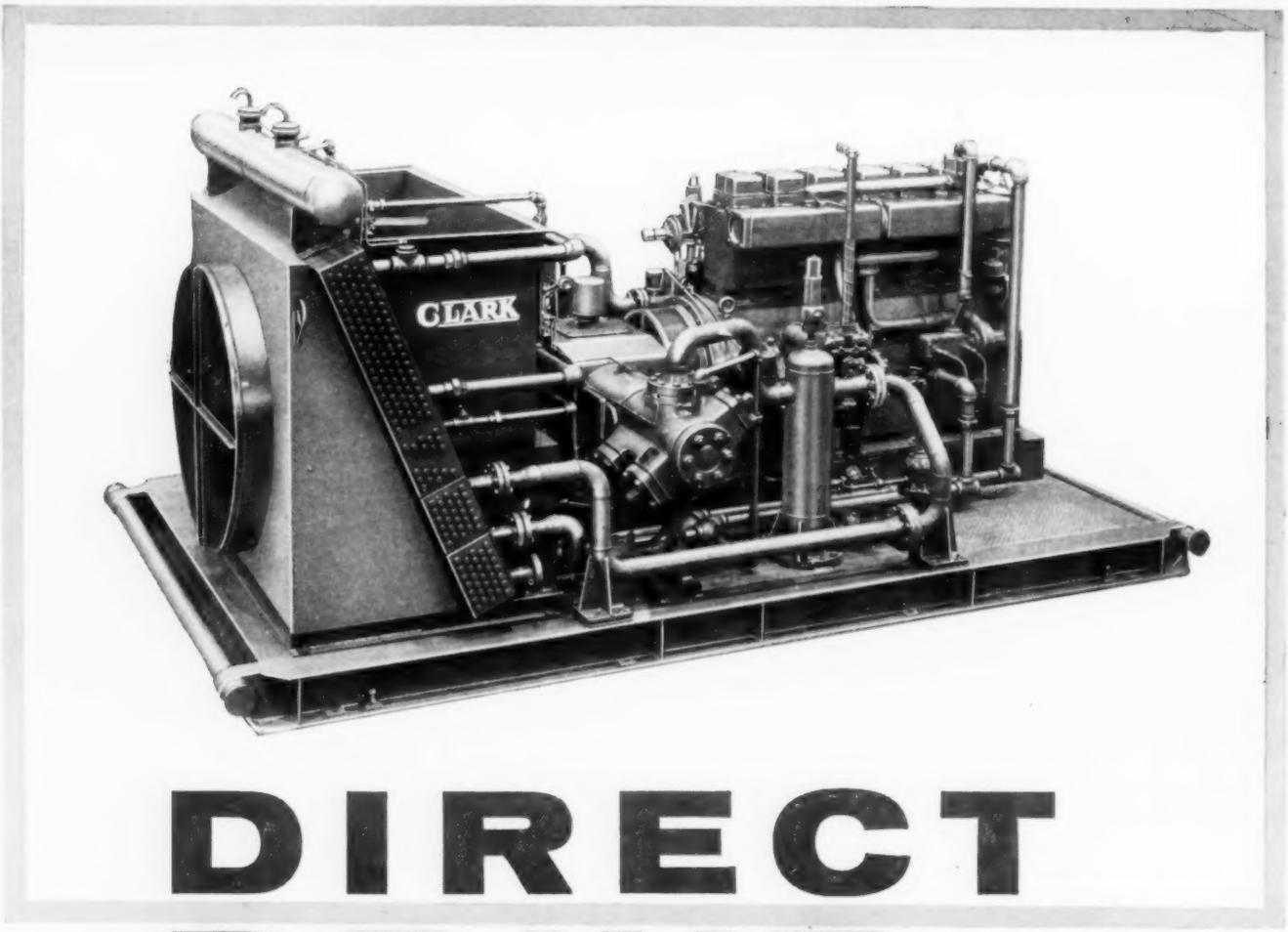
An International TD-9 crawler tows the generator that provides current for the final welds of El Paso Natural Gas Company's "big-incher." One pair of generators is platform-mounted on a TD-18 — another pair is towed by a TD-18.

The CRC cleaning and priming unit on this job is powered with an International U-282 power unit. The wrapping machine is also powered with an accurate-governing U-282 unit!

INTERNATIONAL®
SUPERIOR®

International Harvester Company, 180 N. Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.



DIRECT DRIVE...

A unique feature of the Clark CFA Packaged Field Compressor

One of the simplest ways to take the bugs out of packaged field compressors is to direct-couple the compressor to the engine. Clark engineers did exactly that when they designed the new CFA. Troublesome, power-robbing belts and gears between the engine and the compressor are not required. A simple rubber block coupling takes their place. But this achievement was made possible only because the CFA is so perfectly balanced and therefore can operate at a modern 1,000 rpm. without a quiver or a shake. Furthermore, the CFA is typically Clark. It has the built-in stamina and precision of its big brothers. You'll deplete the field, but you won't wear out the Clark compressor.

There are two and four cylinder CFA models available in the 100-350 bhp. range. Your nearest Clark representative has all the facts and can tell you of other operators' experiences with the CFA.

CLARK BROS. CO. **OLEAN, N. Y.**

One of the Dresser Industries

Offices in Principal Cities Throughout the World

CLARK **Packaged Field Compressors**

Your Wickwire Rope Distributor and our sales engineer ... a helpful team

This sales engineer—an expert on the selection, installation and maintenance of our products—is with your Wickwire Rope Distributor every time he makes a call.

True, sometimes he's hundreds of miles away, working in the field or at the mill. Yet, even if he's not there in person, your Wickwire Distributor has the full assurance that sales engineers such as this one are *always* quickly available to help you.

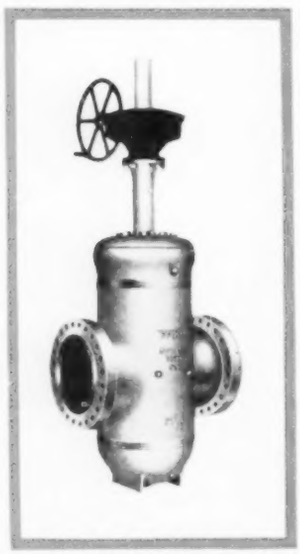
It's just one more reason why your Wickwire Distributor knows he's got top-quality wire rope, slings and strand to sell . . . and that these products will serve you well.

4086

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

W-K-M Valves—

have all the features* essential for safe, successful hot tapping



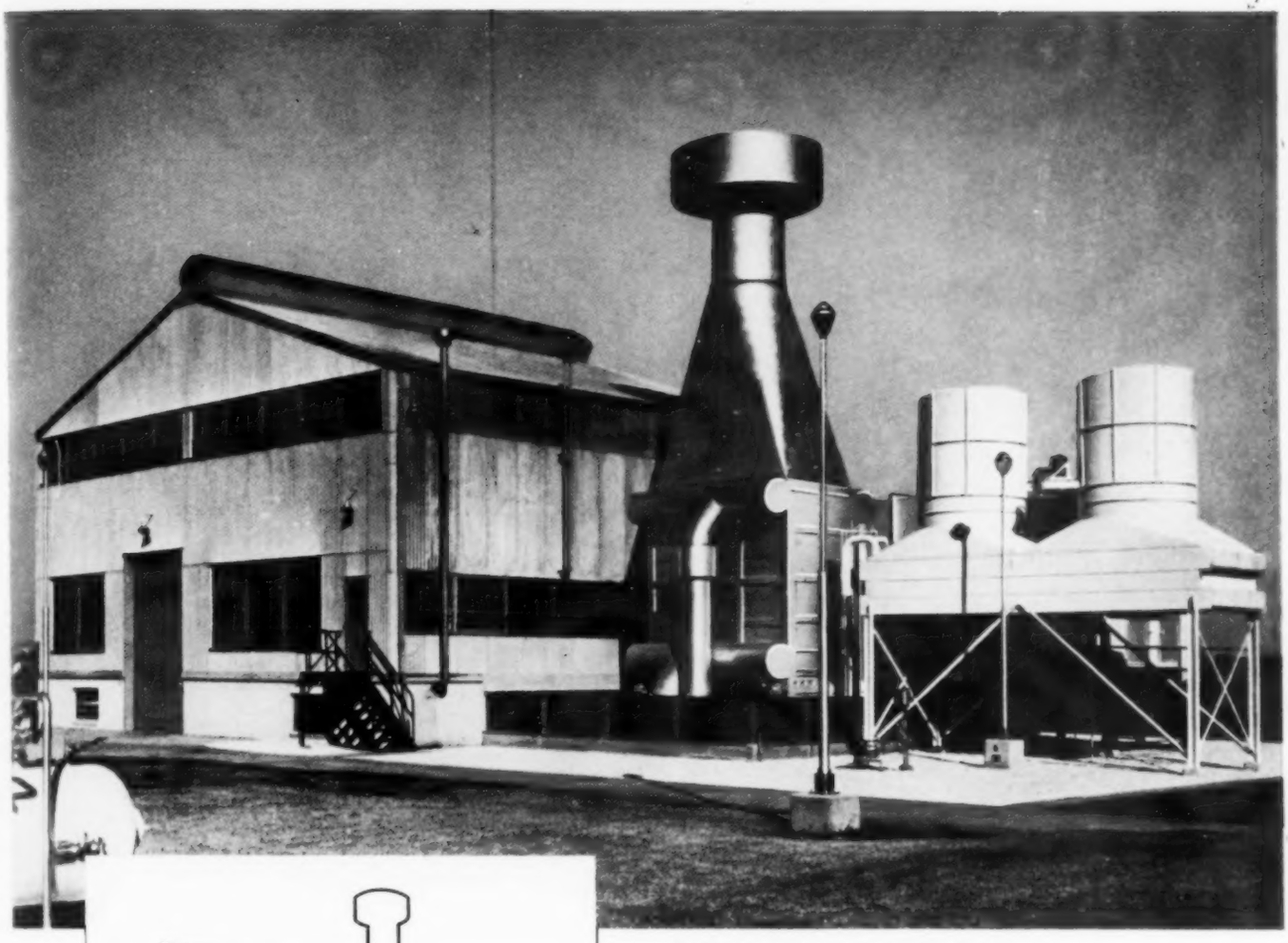
* Through-conduit assures a free, unobstructed passageway for tapping bit.
* Parallel expanding gates provide positive upstream and downstream seal.
* Completely protected, seats cannot be damaged during tapping operation.
* When tapping machine is removed and valve is closed and opened, the shavings are dumped directly into the line . . . cannot interfere with valve operation.

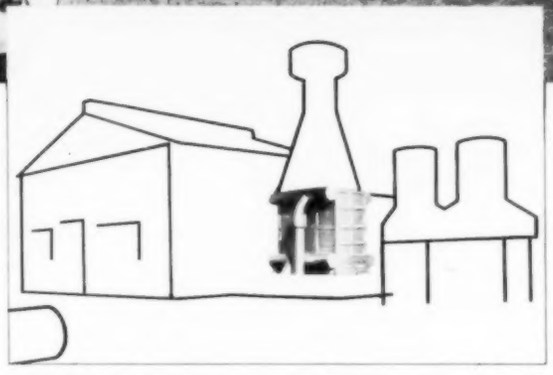
When tap is completed—and bit removed—your new take-off line will have the industry's finest pipeline valve, ready to give you years of dependable service. Talk to your W-K-M representative about the money-saving performance and versatility of W-K-M Pipeline Valves. W-K-M Division of acf Industries, Incorporated. Plant: Missouri City, Texas, Mailing Address: P. O. Box 2117, Houston, Texas.

5618

W-K-M
DIVISION OF acf INDUSTRIES
INCORPORATED

MANUFACTURERS OF W-K-M GATE VALVES acf LUBRICATED PLUG VALVES KEY-KAST ALLOY STEEL PIPING FITTINGS KEY RETURN BENDS AND FITTINGS





This is the Trunkline Gas Company's Edna Compressor Station with a Pin-Fin installed. Note the compactness of this regenerator.

* Specially designed "pin-like" shapes, which project inside the heat transfer core, give the new Air Preheater Pin-Fin its name. Their unique, patented design greatly extends heat-transfer surface area.

New Pin-Fin users are:

Tennessee Gas Transmission Co.	1 unit
Trunkline Gas Co.	3 units
Texas Eastern Transmission Corp.	6 units

NOW...economy in gas-turbine cycles with Air Preheater's new Pin-Fin* Regenerator

To compete commercially with Diesel engine steam-turbine and gas-engine cycles, a gas turbine must normally include a heat exchanger. And the most efficient unit for this service is Air Preheater's Pin-Fin—the new, extended-surface heat exchanger.

For example, a 75%-effectiveness Pin-Fin Regenerator in a gas-turbine cycle at 6-to-1 pressure ratio and a turbine inlet of 1500°F. will reduce fuel consumption by approximately 32%.

Air Preheater Pin-Fin Regenerators have been in service up to five years with no major maintenance problems. For details, call or write the Air Preheater Corporation.

MECHANICAL ADVANTAGES OF THE PIN-FIN

- Compact
- Lightweight
- Quickly erected
- Minimum maintenance
- Convenient, one-unit design
- Readily disassembled

The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

Canada's first

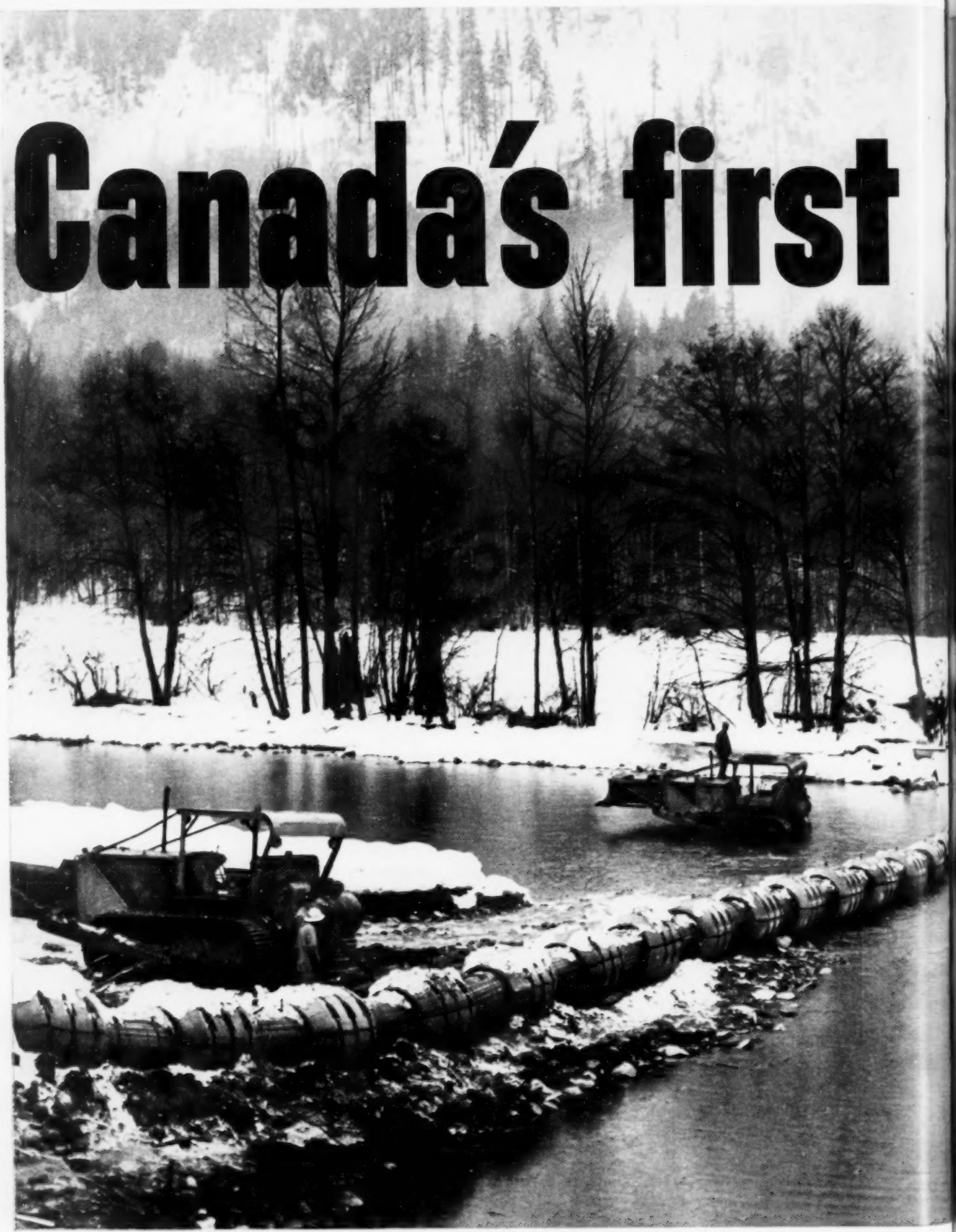
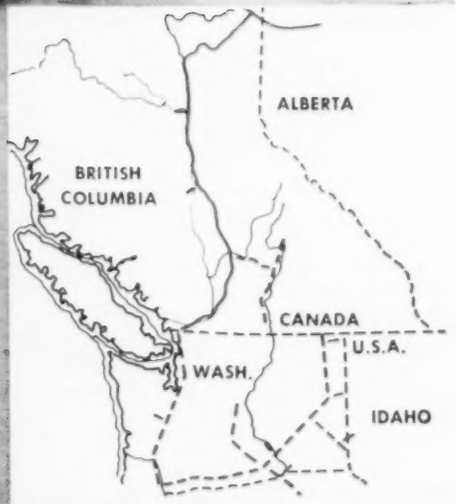


Photo shows the crossing of the Coquihalla River near Hope, British Columbia. The 30-inch diameter pipe is loaded with river weights and laid in a ditch beneath the river bed with eight feet of cover. Some of the river crossings, like this, were intentionally made during the winter when the water was at its lowest level.

"BIG INCH"



Kick-off for the line was at Huntington, B.C. Linkup with Pacific Northwest Pipelines is a short distance east of Vancouver. Westcoast has been authorized to draw gas from more than 42 million acres in the Peace River section in Alberta and British Columbia.

Westcoast Transmission Company, Limited, lays natural gas pipelines which will link British Columbia and New Mexico

TO tap the prolific gas resources of northeastern British Columbia and northwestern Alberta, Westcoast Transmission Company is now laying a 30-inch pipeline from the fields, almost due south to the international border near Vancouver. The line will provide natural gas for British Columbia and Pacific Coast States, the latter through a linkup with Pacific Northwest Pipeline Corporation which is currently completing a pipeline from New Mexico to the Northwest area.

Westcoast Transmission's 688-mile main line will have a maximum capacity of 660 million cubic feet per day and its completion will mark the first large-scale interchange of natural gas between western Canada's new and expanding fields and United States markets. Canadian Bechtel Limited are managers of engineering and construction for the project.

Marks first deliveries of 30-inch pipe from A. O. Smith Milwaukee plant

Approximately 22% of the 30-inch pipe used by Westcoast Transmission was shipped to the job from A. O. Smith's Milwaukee pipe mill. It was the first pipe of this size produced in the Milwaukee pipe mills' new facilities.

For almost 30 years . . .

A. O. Smith line pipe has always been manufactured to a high standard of quality . . . precisely controlled at every step of production. That's why A. O. Smith pipe, made and installed in 1928, is still in operation. That's why so much A. O. Smith pipe is in nearly every important high-pressure line.

Through research A.O. Smith *. . . a better way*

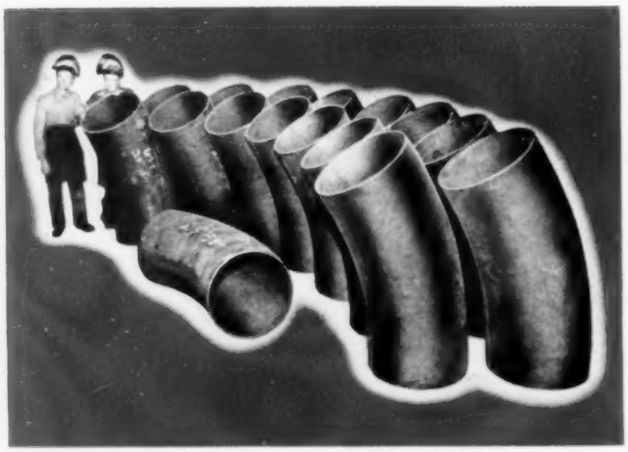
A.O.Smith
CORPORATION

TUBULAR PRODUCTS DIVISION
Milwaukee 1, Wisconsin

Chicago 4 • Dallas 2 • Los Angeles 17 • Midland 5, Texas • New Orleans 12
New York 17 • Pittsburgh 19 • San Francisco 4 • Seattle 1 • Tulsa 3 • Washington 6, D. C.
International Division: Milwaukee 1, Wisconsin

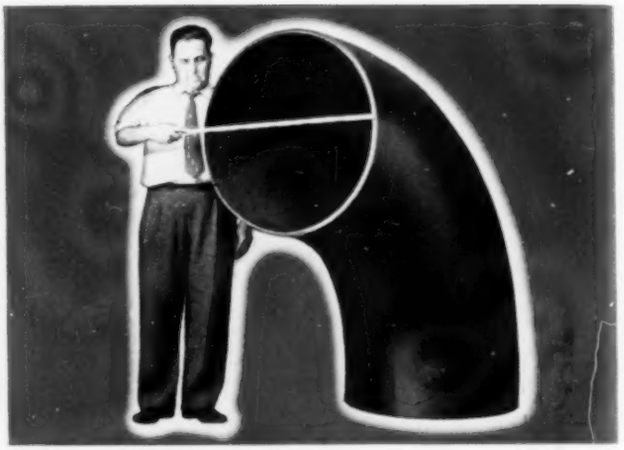
MIDWEST PIPELINE WELDING FITTINGS

SAVE TIME . . . CUT COSTS . . . SOLVE PROBLEMS



CONTOUR ELBOWS

Originated by Midwest and available in 22", 24", 26" and 30" sizes. Angles 10°, 15°, or 30° with 3D radius, providing a long sweep for easy pipe cleaning. 8" tangent at each end removes weld from highly stressed curved section and facilitates alignment. Uniform concentricity permits smaller angles to be obtained by cutting elbow. Available in various wall thicknesses of carbon steel, high yield and low alloy materials. Write for data sheet.

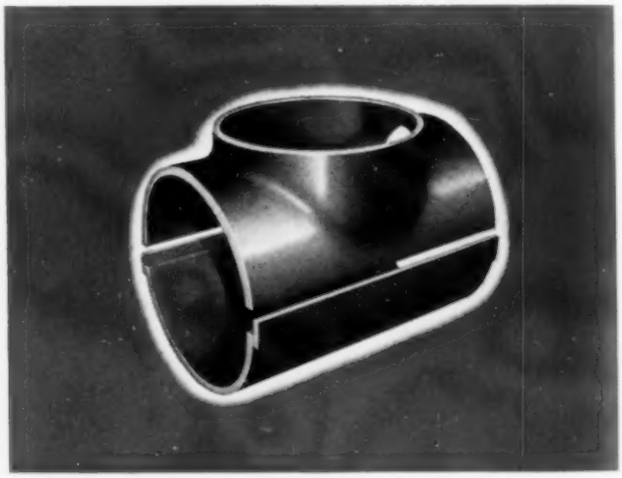


LONG TANGENT ELBOWS

Cost no more than ordinary elbows and are available up to 36" OD in wide variety of materials and wall thicknesses. Tangent at each end equal to ¼ nominal pipe size up to 24" OD—all larger sizes have 6" tangents. These added straight ends save pipe and often eliminate short nipple and extra weld; they remove circumferential welds from point of greatest stress . . . make lining up easier, save time and expense in welding. Write for Catalog 54.

REDUCING ELBOWS

Takes the place of straight elbow and reducer, thus saving one weld, requiring less space and reducing turbulence of flow. Stock sizes available up to 30" OD and in reductions to one-half of large diameter. Being fabricated from plate, it can be made in special thicknesses and materials. Write for data sheets.



WRAP-AROUND SADDLES

"Complete encirclement" type of welded branch reinforcement for making hot taps is available with or without welding strap and from carbon steel or high yield materials. In addition to fitting shown, other types illustrated in Section 8 of ASA B31.1 are available. Write for Data Sheet No. 20.

CAP SADDLES

Reinforcement for nozzle connection into cap. Available in sizes up to 24" on 36" in carbon steel and high yield materials.

Recognizing the fact that conventional welding fittings do not always best meet pipeline needs, Midwest some years ago began the development of special fittings. These are designed for a specific job . . . to save time, cut cost and improve pipelines. The unique Midwest method of manufacture makes the use of special materials easy, economical and permits better delivery . . . it also often enables us to improvise to exactly meet unusual conditions. Write us regarding your requirements.

MIDWEST PIPING COMPANY, INC.

Main Office: 1450 South Second St., St. Louis 4, Mo.

PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

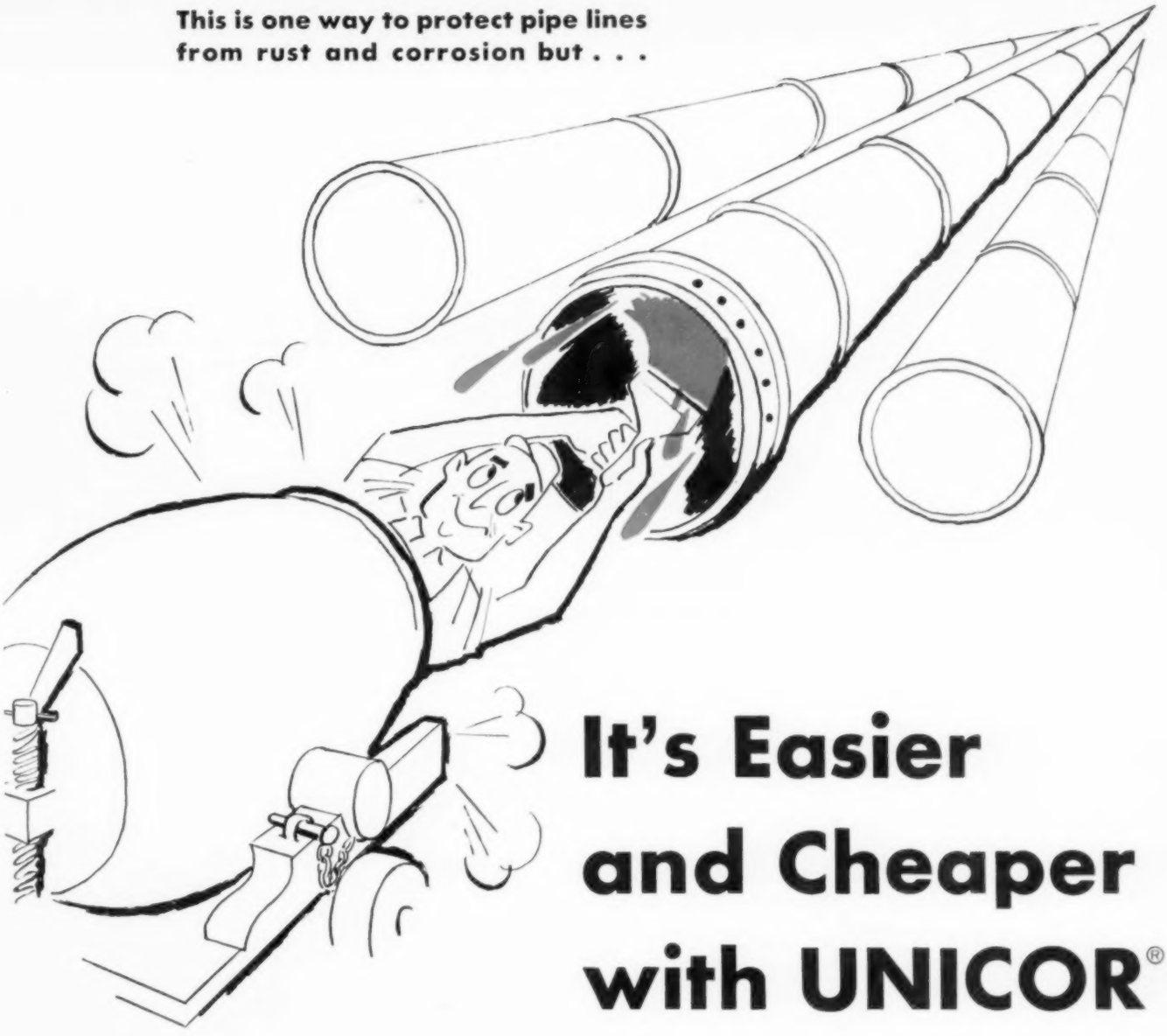
SALES OFFICES:

ASHEVILLE (BOX 446, SKYLAND, N.C.)
BOSTON 27—426 FIRST ST.
CHICAGO 3—79 WEST MONROE ST.
CLEVELAND 14—616 ST. CLAIR AVE.
HOUSTON 2—1213 CAPITOL AVE.
LOS ANGELES 33—520 ANDERSON ST.
MIAMI 34—2103 LE JEUNE RD.
NEW YORK 7—50 CHURCH ST.
ONEIDA, N.Y.—282 NORTH MAIN ST.
SAN FRANCISCO 11—420 MARKET ST.

STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

7676

This is one way to protect pipe lines from rust and corrosion but . . .



It's Easier and Cheaper with UNICOR®

UNICOR, UOP's oil soluble corrosion inhibitor, gives dependable protection at suprisingly little cost. Actually only one molecule of Unicor is required for every million molecules of pipe line product. Its cost is only about $0.0005 per barrel of product.

It's economical to apply, too. Addition is made at only one point and since it is distributed evenly over the entire internal surface, protection is virtually 100% effective. There are important additional savings, too, from reduced scraper cleaning and filter replacement costs.

We will be glad to have our technical specialists assist you in the design, installation and operation of a Unicor system of protection.

UNICOR is one of a number of UOP inhibitors and additives available to the refining industry. If you have a protection or preservation problem for product or transport facilities consult us.

PRODUCTS DEPARTMENT

UNIVERSAL OIL PRODUCTS COMPANY

30 ALGONQUIN ROAD, DES PLAINES, ILLINOIS, U. S. A.

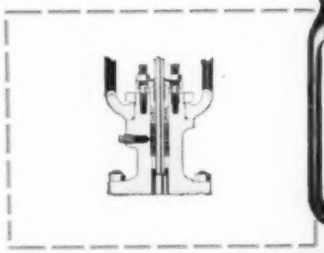
Any Way You Look At It

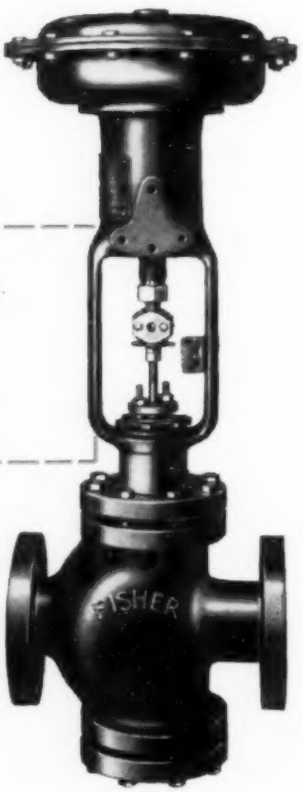
FISHER® Control Valves

are your BEST BET!

DIAPHRAGM ASSEMBLIES

Extra thick steel casings are zinc electro-plated, iridited and then given prime and final paint coats. Specially designed molded diaphragm with nylon insert gives practically constant effective area throughout valve stroke.



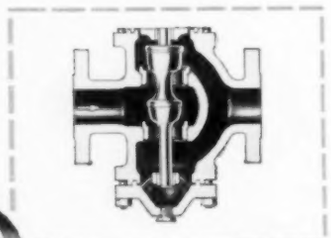


STUFFING BOX

Bolted gland stuffing box with Teflon V-Ring packing. Highly polished valve stem is finished to 2-3 micro-inches RMS to insure effectiveness of packing and keep friction to absolute minimum.

BODY ASSEMBLIES

Large capacity bodies with accurately machined inner valves are individually "ground in" under customer's specified temperature conditions.

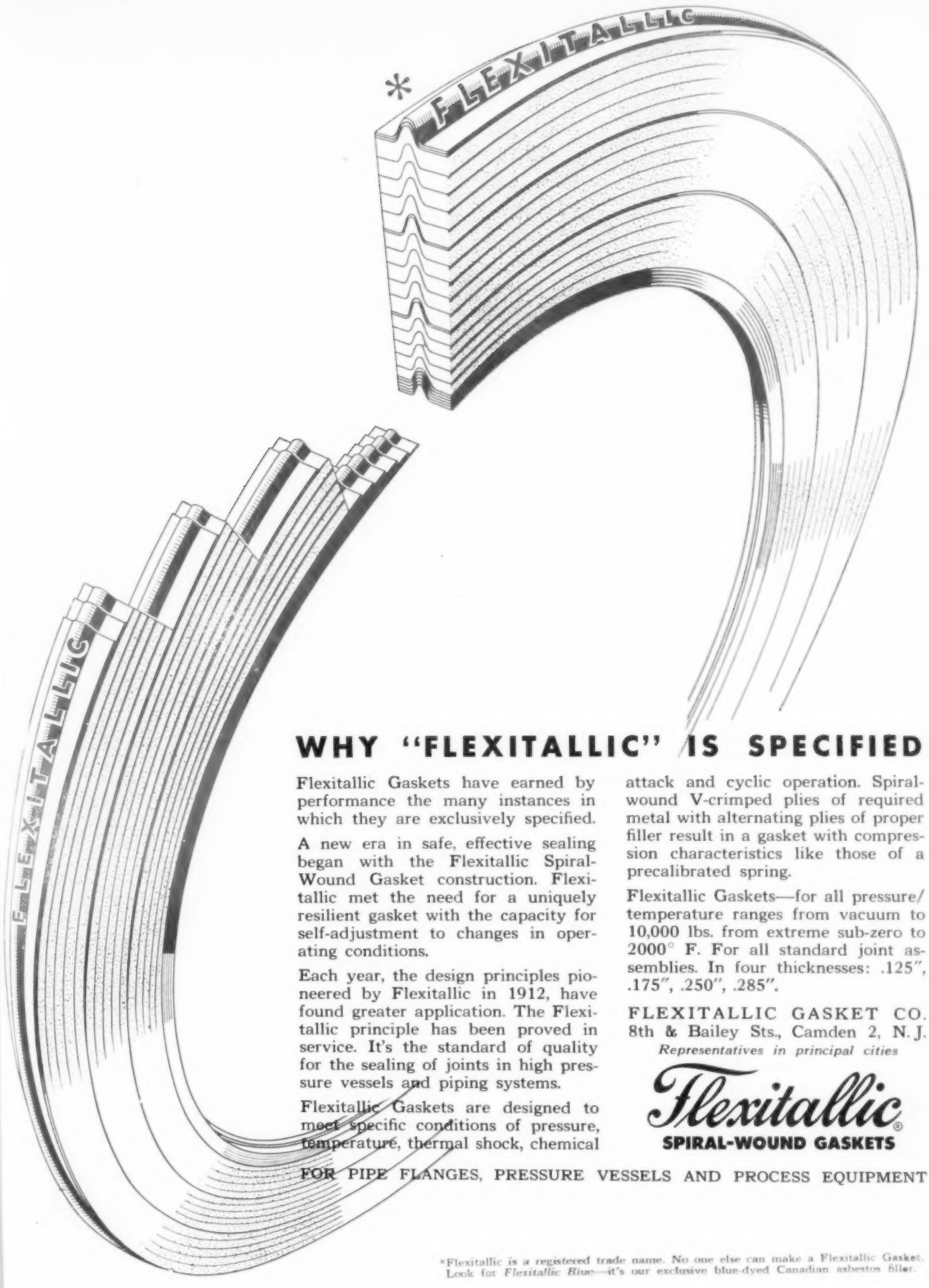


Realizing their importance in the control system, Fisher has given careful attention to design and construction of diaphragm control valves. Any way you look at it — from the standpoint of durable construction or accuracy of performance—Fisher Diaphragm Control Valves are your best bet.

FISHER GOVERNOR COMPANY

Marshalltown, Iowa • *Woodstock, Ontario*

World Leader in Research for Better Pressure and Liquid Level Control



WHY "FLEXITALLIC" IS SPECIFIED

Flexitallic Gaskets have earned by performance the many instances in which they are exclusively specified.

A new era in safe, effective sealing began with the Flexitallic Spiral-Wound Gasket construction. Flexitallic met the need for a uniquely resilient gasket with the capacity for self-adjustment to changes in operating conditions.

Each year, the design principles pioneered by Flexitallic in 1912, have found greater application. The Flexitallic principle has been proved in service. It's the standard of quality for the sealing of joints in high pressure vessels and piping systems.

Flexitallic Gaskets are designed to meet specific conditions of pressure, temperature, thermal shock, chemical attack and cyclic operation. Spiral-wound V-crimped plies of required metal with alternating plies of proper filler result in a gasket with compression characteristics like those of a precalibrated spring.

Flexitallic Gaskets—for all pressure/temperature ranges from vacuum to 10,000 lbs. from extreme sub-zero to 2000° F. For all standard joint assemblies. In four thicknesses: .125", .175", .250", .285".

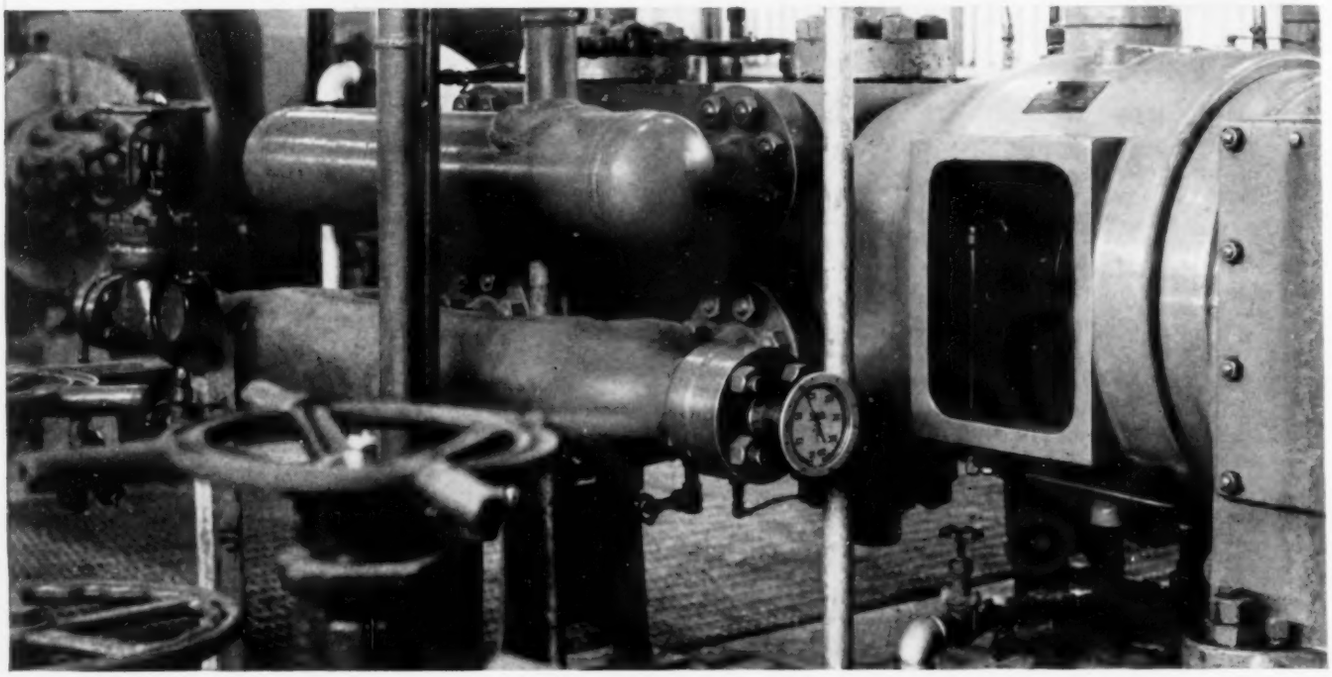
FLEXITALLIC GASKET CO.
8th & Bailey Sts., Camden 2, N. J.
Representatives in principal cities

Flexitallic®
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue*—it's our exclusive blue-dyed Canadian asbestos filler.

VIBRATION



Vibration of refinery compressor proves unshakable accuracy of RMC thermometer

The RMC Thermometer shown in the photograph is constantly subjected to extreme vibration from the two-stage Synthesis Gas Compressor on which it is installed. This powerful equipment is used to compress a mixture of H_2 and N_2 from 400 to 3500 pounds—at the Philadelphia Synthetic Ammonia Plant of The Atlantic Refining Company.

This particular job required a special thermometer that could withstand the constant and terrific vibration, and at the same time provide and maintain precise, accurate readings. Rochester Manufacturing Company promptly came up with the answer—a silicone-dampened, bimetallic, angle-form RMC thermometer. And this is but one example of how RMC engineering skill provides instruments that meet the most demanding and exacting requirements.

Look to RMC for Full-Line Instrumentation

DIAL THERMOMETERS

Illustrated here is a 6" dial thermometer with hermetically sealed dial chamber, external recalibration—built for heavy duty service. What are your thermometer requirements?

PRESSURE SWITCHES

This RMC Pressure Switch will stand heavy pulsating pressures, has close on-off differentials, maintains consistent cut-in, cut-out settings. What are your pressure switch problems?

TELL US YOUR REQUIREMENTS FOR DIRECT MOUNTING AND REMOTE INDICATING INSTRUMENTS, AND LET RMC ENGINEERING SKILL PROVIDE THE ANSWERS!

REPRESENTATIVES IN ALL PRINCIPAL CITIES

RMC

"You Can Rely On Rochester"

LIQUID LEVEL, TEMPERATURE and PRESSURE INSTRUMENTS

© 1956 Rochester Manufacturing Co., Inc.

ROCHESTER MANUFACTURING CO., INC.
207 ROCKWOOD STREET • ROCHESTER 10, N.Y.

Acme-Newport

ELECTRIC WELD LINE PIPE*
QUALITY CONTROLLED ALL THE WAY

In a battery of modern electric furnaces noted for their exact control, Acme-Newport melts steel to every requirement demanded by rugged line pipe installations. This high standard of quality prevails throughout every step . . . rolling, pipe forming and final hydrostatic testing. The result is tough line pipe, uniform in roundness and wall thickness, ready to bend and weld easily. Conscientious personnel, 72 years' steelmaking experience, and strategic location on dependable water and rail routes, make Acme-Newport a most logical source for 4" and 6" electric weld line pipe.*

*SIZES AND WEIGHTS AVAILABLE

O.D.	Wall	Wt. Per Ft.
4½	.125"	5.84
	.142"	6.61
	.156"	7.25
	.188"	8.64
	.219"	10.00
	.237"	10.79
6⅝	.134"	9.29
	.156"	10.78
	.188"	12.89
	.219"	14.97
	.250"	17.02
	.280"	18.97

ECONOMICAL WATERAIL-TRUCK DELIVERY

The Company is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 13 motor carriers enable Acme-Newport to give economical, dependable delivery to the entire area of the Middle West and South.

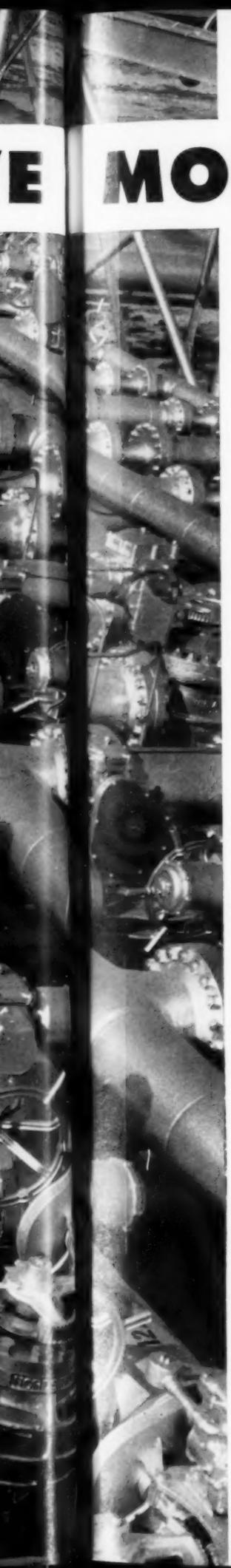
Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

HOW TO SAVE

Rockwell-Nordstrom gear operated and electric operated valves at automatic products pipeline manifold.



E MONEY ON MANIFOLDS

...and get better flow control

One lone valve that leaks or causes maintenance problems may not be too noticeable. But a pipeline manifold with *hundreds* of valves is a different matter. That's why you so often see huge manifolds (like the one at the left) 100% equipped with Rockwell-Nordstrom lubricated plug valves. Here's why they will save you money and assure better flow control year after year:

Lower Maintenance: Lubrication is preventive maintenance against repair and replacement . . . trouble doesn't have a chance to start. Also, the seats are *never* exposed to the line.

Longer Life: Lubrication prevents the grinding wear of metal-to-metal friction that ruins ordinary valves so quickly.

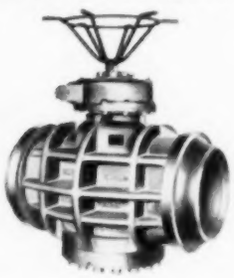
Positive Shut-Off: Costly product loss and contamination are eliminated because pressurized lubricant forms a tough, instantly replaceable seal that can't "wear out."

Compact Design: There are no bonnet cavities or rising stems. They can be manifolded much tighter . . . cuts investment in pipe, flanges, fittings, etc.

Rockwell-Nordstrom lubricated plug valves are available in a complete range of sizes and pressure ratings to meet your every pipeline need. They can be supplied with electric, hydraulic or pneumatic motor operators for automatic and remote operation. And they cost no more to buy—often less—than ordinary valves. See your supplier or write Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Valve Licensee:* Peacock Brothers Limited.

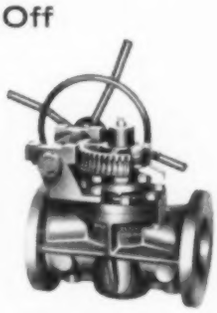
ROCKWELL-Nordstrom VALVES

Lubricant Sealed For Positive Shut-Off



Rockwell-Nordstrom Hypreseal valves for pressures to 10,000-lb WOG and in sizes to 30" by 34".

Rockwell-Nordstrom Multiport 3-way valves for pressures to ASA 1,500-lb WOG and in sizes to 16".



Rockwell-Nordstrom Standard valves for pressures to ASA 600-lb and in sizes to 30".

Construction men fought terrain and bitter cold in the construction of PNW's "scenic-inch" pipeline.

Why communications have to be good on Pacific Northwest's "scenic-inch" line

Pumping gas over mountain passes across 1487 miles of America's toughest terrain requires the most reliable communications available.

Pacific Northwest Pipeline Corp. presented this requirement to the Bell System, with one additional request—economy.

The result is a private line telephone system that PNW's Salt Lake City control center uses to keep a running summary of conditions along the line. Information gathered in Salt Lake City from each compressor station includes dew point, BTU content and specific gravity of the gas. Dispatchers use this data as guidance in controlling flow.

. . .

Bell System communications can work for you as fast and reliably. Just call your Bell Telephone Company business office. A representative will gladly discuss your requirements.

Pacific Northwest's Salt Lake City dispatchers collect data hourly from every compressor station and maintenance point on the company's 1487-mile pipeline.

BELL TELEPHONE SYSTEM

PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER DATA TRANSMISSION SYSTEMS • CHANNELS FOR: REMOTE METERING AND CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV

PIPE LINE PANORAMA

Construction Sets Fast Pace . . . Plans for three major pipe lines are shaping up in rapid order:

- Construction of 400,000-500,000 bpd crude line from West Texas to Gulf Coast will get underway in next few months. Six companies, are backing project—Continental, Cities Service, Atlantic, Gulf, Texaco and Sinclair.

  Magnolia, also in on initial planning, has pulled out. Will expand its own West Texas-Gulf Coast crude lines 75,000 bpd.

- Pipe line to provide first statewide natural gas service to Florida is scheduled to start construction this summer. Houston Texas Gas and Oil Corp. and Coastal Transmission are joining in the 2600-mile, $150 million project. Line will stretch from Rio Grande Valley to South Florida.
- Question: Will ODM give American Pipe Line green light to build products line from Gulf Coast to Newark, N. J.—or will FPC let Texas Eastern convert 1168-mile section of "Little Big Inch" (Baytown, Texas, to Moundsville, W. Va.) from gas to oil products?

  FPC is expected to give answer shortly—and from all indications, American Pipe Line's chances are improving.

"Magic" to Lay Offshore Line . . . First American ocean-going barge designed specifically to lay pipe offshore is now on shakedown cruise. The $750,000 *Magic* can lay 2000 feet of large diameter or 5000 feet of small diameter pipe per day. Has crew of 46 for around-the-clock work. Owner: Marine Gathering Co., subsidiary of Commonwealth Oil Co.

New Policy for Middle East Pipe Lines . . . British are asking U. S. to support charter guaranteeing international freedom for oil pipe lines. Plan in part:

- Interested companies would spell out code of conduct governing countries which allow transit of oil across their borders.
- Middle East States, the primary participants, would be invited to subscribe and adhere to such a charter, or risk being cold-shouldered by oil producing and consuming nations.
- Give government backing to oil companies in their efforts to re-route pipe lines across countries whose political stability and friendship for the West are beyond question.

Latter point is subject of series of London meetings being held by executives of several leading oil companies. They are considering plans to build new pipe lines out of Iraq, bypassing Syria, Jordan and Lebanon, cutting across Turkey toward northern terminal and southward to Persian Gulf.

Untying the Legal Knots . . . FPC reports it will be 1960 before commission gets abreast of additional gas regulation decreed by Supreme Court decision in Phillips case.

Hopes are expressed that commission can step up action by handling some independent producers' rate cases collectively (i.e., where producers are selling from same areas or fields). However, there are two monkeys in the woodpile: FPC chairman doubts if collective action would be legal since law was supposedly designed for pipe line companies—Natural Gas Act pre-supposes separate treatment for each natural gas company.

Coal-Plugged Pipe Line . . . New 108-mile Pittsburgh Consolidation coal pipe line has run into trouble. About 400 tons of the fuel got stuck in mid-February, and at latest report it was still stuck. Result: April 9 dedication has been delayed.

New Pipe Wrapper for Middle East . . . Pipeliners in Kuwait area will soon be using new type pipe-wrapping machine that will double-coat and wrap 30-40 inch lines.

If Oil Could Speak . . .

If oil could speak it would have many fascinating truths to tell the non-oil public—truths that would win thousands of new friends for the oil industry. Oil can't speak—but you as an individual can win many new friends for the oil industry if you will pass the true facts on to your non-oil industry friends.

Here are some of those true facts. They are being presented for one purpose: To keep you posted on your industry, so you can tell the story oil is unable to relate.

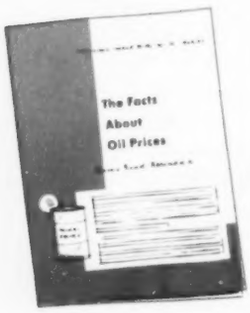
Read these facts here. You will find them informative and interesting. Then read below for still another way you can help spread the truth about the oil industry.

"If Oil Could Speak" it would tell the American public:

- Last year the oil industry paid more local, state and federal taxes than any other industry—*nearly $5.5 billion*, excluding employe income taxes. The oil and gas industry paid Texas *$191 million* in taxes last year—about one third of all tax and license revenues paid by industry and business in the state.
- Out of about $4 billion or more spent annually in the U. S. on exploration and drilling of wells, roughly *half of the money is lost* on unsuccessful ventures.
- While the rate of discovery per foot of drilling has gone down over the past decade, the cost of exploration and production and development for each barrel of net crude oil has *more than doubled*—from about $1.50 at the end of World War II to more than $3 now.
- Raising octane numbers to meet requirements of new high powered cars costs big money. One company estimates that a recent raise of two octane numbers is costing its refinery *$10 million a year* in additional operating expense.
- Average cost of drilling a wildcat well is *$90,000* . . . and can range up to *more than $1 million.*
- Consumption of oil by modern war machines is almost unbelievable. One of our newest airplanes burns in one hour as much fuel as the typical family auto in three years.

Oil Can't Speak . . . <u>But You Can!</u> . . . Here's How . . .

The March issue of PIPE LINE INDUSTRY contained an eight-page supplement entitled *The Facts About Oil Prices.* We're flattered by the thousands of reprints that have been ordered and the compliments received.



"It should go a long way toward acquainting oil men with the facts concerning the price of oil," writes the president of a major oil company.

That is one of the purposes . . . but the aim is even broader and is supported by further comment from the same executive. *"It should do even more to help those understand it (price of oil) who are not as familiar with the subject as oil people . . ."*

The supplement was prepared with non-oil people in mind. It will be most effective if put into the hands of the general public. The ideas of making it available to employes to pass to friends and neighbors is one good way of accomplishing this. If this is done on a wide enough basis, the message can be carried to millions of people.

The marketing division has an especially fine opportunity in non-oil producing states, because this is where the industry's public relations is the poorest . . . and the marketing division is the only part of the industry operating in such areas.

Some who have ordered reprints . . . major companies, independents, individuals and associations . . . have indicated that the pamphlets are being given to employes to give to friends outside the industry. *"It is more effective when presented by someone known to you than if it merely comes through the mail from an unknown party,"* says one reader.

An API official calls it *"a superb job . . . one of the finest anyone has come up with . . ."* An officer of IPAA says *"an outstanding job . . . both needed and helpful."*

The Facts About Oil Prices is already in its third printing. We humbly hope we will be able to print more while the need is at its height. As long as this pamphlet will help fill this need, we will furnish reprints at our printing costs . . . in the hope that even more copies will find their way into the hands of the millions of people outside the oil industry who help formulate public opinion.

Prices are as follows: Quantities under 100—10 cents each; 100 to 1000—7½ cents each; more than 1000—5 cents each; more than 10,000—4½ cents each, and more than 20,000—4 cents each.

Send your orders for reprints to:

GULF PUBLISHING COMPANY
Post Office Box 2608
Houston 1, Texas

Pipe Line Leaders Meet in Houston

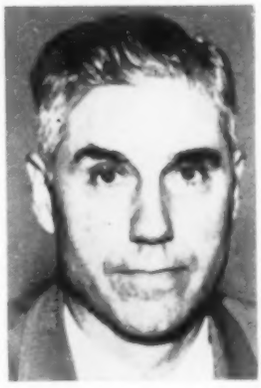
Technical program of the 29th annual conference and exhibit features papers on transistors, supervisory control and communications regulation.

PIPELINERS ARE continuing to take an active lead in petroleum industry communications developments. Exhibits and program at the 1957 meeting of the Petroleum Industry Electrical Association and Petroleum Electric Supply Association in Houston on April 16-18 highlight many topics of interest for the pipe line engineer.

Leaders of the PIEA and PESA show are: H. A. Rhodes, Transcontinental Gas Pipe Line Company, President PIEA; J. W. LaBoon, PIEA, Shell Pipe Line Company and Douglas F. Ball, PESA, Motorola, Inc., General Chairmen of the Convention.

Technical papers on all phases of communications, from recent developments to future trends, will be presented.

Registration for the 29th annual convention begins April 15 at the Shamrock-Hilton Hotel where the conference and exhibits will be held. Exhibits will be open throughout the meeting.



H. A. Rhodes is 1957 president of the PIEA.

J. W. La Boon, PIEA, will serve as presiding chairman of the 29th Annual Conference and Exhibit.

HIGHLIGHTS OF THE PROGRAM

Monday, April 15—Registration and Board of Directors meeting.

Tuesday Morning, April 16, 9:00 A.M. Welcoming Address—Ben C. Belt, Gulf Oil Corporation, President of Houston Chamber of Commerce.
W. C. McGee, Jr., Senior Vice President, Tennessee Gas Transmission Company, Principal Speaker.

Tuesday Afternoon, Technical Sessions.

2:00—"Message from FCC," Robert T. Bartley, Commissioner, Federal Communications Commission.

2:30—"Transistors—a Revolution in Electronics," Daniel E. Noble, Motorola Research Laboratory, Phoenix, Arizona.

3:00—"Trends in Polyethylene for the Cable Industry," S. J. Rosch, Anaconda Copper & Cable Company, Hastings-on-Hudson, New York.

Wednesday Morning

9:00—"Report from Washington," Joseph E. Keller, Special Representative of API, National Petroleum Radio Frequency Coordinating Association, and Counsel for PIEA.

9:45—"Ferrites," Duncan H. Looney, Technical Staff, Bell Telephone Laboratories, Murray Hill, New Jersey.

10:15—"Add-a-Phase Power Converter," L. B. Ronk, System Analyzer Corporation, Nokomis, Illinois.

Wednesday Afternoon

2:00—"Single-Sideband Modulation," Burkett Farquhar, Collins Radio Company, Cedar Rapids, Iowa.

2:30—"Use of 25-50 Mc Frequencies in Petroleum Industry," P. R. Wofford, Texas Gas Transmission Company, Owensboro, Kentucky.

3:00—"Safety Demonstration," O. A. Cavanagh, Underwriter's Laboratories, Inc., Chicago, Illinois.

Thursday Morning

9:00—"Supervisory Control and Telemetering," E. Wylie Head, Control Corporation, Minneapolis, Minnesota.

9:30—"Corrosion—Round Table"
M. A. Riordan, Moderator, Rio Engineering Co., Houston.

Thursday Afternoon

1:30—"Auxiliary Power Plants," A. R. Johnson, D. W. Onan & Sons, Inc., Minneapolis, Minnesota.

2:00—"Voices Under the Sea." The Transatlantic cable story on film. Courtesy of Simplex Wire & Cable Company and Southwestern Bell Telephone Company.

—The End

A SPECIAL REPORT

Inside . . . Outside . . . All Around

Standard one-ton window units are installed in north wall of shack just above emergency power unit. Inside thermostat controls unit to maintain temperature around 77 degrees.

In foreground is inlet duct for ventilating fan which cools shack when outside temperature is below 70 degrees. Considerable dust can enter shack when fan is on, even with filters.

Why Transcontinental Likes Cool Microwave Stations

First year of experience with 40 air conditioned shacks shows a 10 percent reduction in tube usage. Better transmitter stability and higher circuit availability are other advantages.

Flat cultivated land around such stations as this one in South Texas can create a serious dust problem during hot dry months. Air conditioning has helped solve this problem.

TRANSCONTINENTAL Gas Pipe Line Corporation communications engineers decided early last spring to do something about costly maintenance and operating troubles caused by dust and high ambients inside 58 microwave shacks. Air conditioning units were installed in 40 of the hottest, dustiest stations; many are located in cultivated fields along the southern section of Transco's Texas-New York system.

Results of cooler, cleaner operation have looked very impressive, especially during the last half of the year when microwave maintenance problems had previously been the toughest. Transco's microwave maintenance men are quick to praise the benefits of the air conditioned units and operating records back them up. Last year's record shows:

- A 10 percent reduction in tube usage, previous tube replacement was about 6600 yearly.
- Equipment stability improved greatly.
- Circuit availability increased to better than 99 percent on southern sector.
- Less emergency troubleshooting calls and station clean up.
- Ventilating filter changes were extended from once every four days to every two weeks.
- More thorough maintenance

the Station . . .

Self cleaning white paint is used on exterior surfaces of shack. Air conditioning unit is on left, about six feet above ground. Emergency power unit cooling air exhaust is just below on front of shack.

checks are now made when men work in 77-degree shacks instead of 120 degrees experienced before on hottest days.

One-Ton Window Units Used. No specially designed equipment or controls were needed to cool the stations; conventional one-ton window units were installed in a port on the north side of the shack just above the emergency power unit. Air is taken from inside the shack, cooled to about 77 degrees and recirculated. In this manner dust admission to the shacks is minimized.

Air conditioning units are controlled by both inside and outside thermostats. During seasons when outdoor temperatures are below 70 degrees, units are cut off and fan blowers bring in outside air to cool microwave equipment and maintain inside temperatures below 77 degrees. When outside temperatures rise above 70 degrees and the inside temperature increases above 77 degrees the air conditioner is automatically turned on to cool and recirculate clean air inside the shacks.

Outside thermostat controls prevent possible freeze-up of the air conditioner's condenser coils and also hold power demands to a minimum. Since installation of the units, average increase in power costs at the 40 stations has been about $12 per month during the hot months of June, July, August and September. Before the units were installed temperatures inside some South Texas stations went as high as 120 degrees when outside temperatures climbed to 105 degrees.

Clean Station . . . Less Maintenance

Louie LeBlanc, Transco's microwave technician at Corpus Christi, makes routine maintenance check at station near Bishop, Texas. Inside of shack can now be kept much cleaner; relay operation has been particularly improved since dust accumulations have been eliminated.

Conditioners Cut Off During Emergency Power Tests. Gasoline engine emergency power units which supply 110 volt AC power at each microwave station are tested for 15 minutes twice each week. At the time they are in operation, the air conditioning units which operate on 220 volts AC are cut off and the shack is cooled by the fan blower. Stations do not heat up excessively during tests, as the exhaust gas and radiator cooling air are both exhausted outside of the shack.

Dust and Heat Reduced. Both dust and excessive heat, two of the worst enemies of microwave equipment, are held in check by Transco's air conditioner installations. Less dust in the shacks improves relay performance. Prior to installation of the units, floors and flat surfaces were often completely covered; cooling fans took in dust laden air from cultivated fields surrounding the stations. Better heat control improves transmitter stability and lengthens tube life. Units now stay in tune better between maintenance calls and there have been less emergency troubleshooting trips, maintenance men report.

Although outage reports have shown a definite reduction since the air conditioners were installed, Transco engineers caution that some other operational changes were made during the same period so improvements may not all be credited to the air conditioners.

Minor Changes Required. With installation of the air conditioners, rubber stripping seals were placed around the doors to the shacks. Two layers of sheetrock used in the top sections of the shacks already provided an effective insulation from the hot sun. Outside surfaces of all of the shacks are completely painted with a reflective self-cleaning white. Only minor wall cuts and wiring additions were needed to install the units. —**The End**

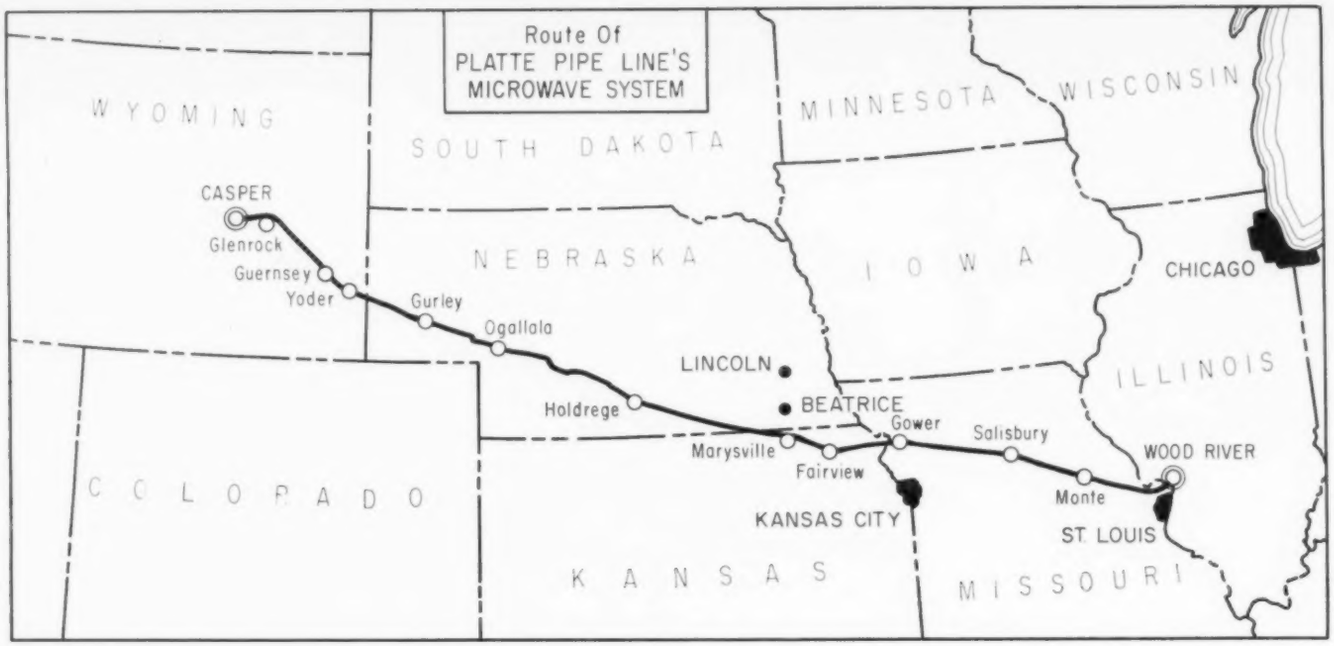


FIGURE 1—Platte pipe line microwave engineers daily check out operation of 45 stations along the 1000-mile system from Wyoming to Wood River, Illinois.

1000 Miles of Microwave Tested From Desk Console

A SPECIAL REPORT

Platte's communications technicians consolidated all of the circuitry needed to test out equipment at 45 microwave stations atop a standard office desk. Daily inspections are now easier and quicker.

By MELVIN A. JUDAH, Editor, PIPE LINE INDUSTRY

MICROWAVE TECHNICIANS at Platte Pipe Line Company's control center in Kansas City have proven that it isn't necessary to be an acrobat to complete a daily circuit check of a cross-country microwave system. To save time and needless effort in making routine checks, all test circuitry is duplicated in a "multiplex test console" that fits conveniently atop a standard five-foot desk.

This console comprises a complete monitor of the company's 45-station microwave system stretching from central Wyoming to Wood River, Ill.

Panel test equipment can check a variety of functions:

- Indicator lights for each microwave station show by coded signal which repeater is in use, if tower lights are working, and check emergency power generator operation.
- Switch panel facilitates two-way switching of microwave station repeaters. This unit is invaluable, Platte's technicians claim, in determining the relative condition of any repeater on the system.
- A jack field is used to measure relay currents of each fault tone receiver, as well as check alarm circuitry operation.
- Strip panel section of indicator lights shows telemetering activity at 15 main line pumping stations without walking into dispatching room.
- Complete test equipment measures audio volume levels throughout system.
- Jack strip is used to observe composite signals (incoming and outgoing) from Kansas City terminal station.
- A VHF control strip panel, CONELRAD monitor, speakers and jacks complete the test console.

Time Saved on Daily Checks. A check-out of Platte's microwave system is started at about 9 o'clock each morning. One microwave channel serves a dual purpose; it is used by technicians for direct and uninterrupted communication by the supervisor of microwave maintenance in Kansas City; in addition, it provides a dialing and audio path for Platte's far-flung VHF system.

Two channels provide microwave fault location and status intelligence to the microwave maintenance center at Kansas City. Operating intelligence is presented as flashing light indications by transmission of a coded audio tone.

All Microwave Equipment has Standby Unit. Each of Platte's microwave repeaters or terminal stations has two complete units. One operates

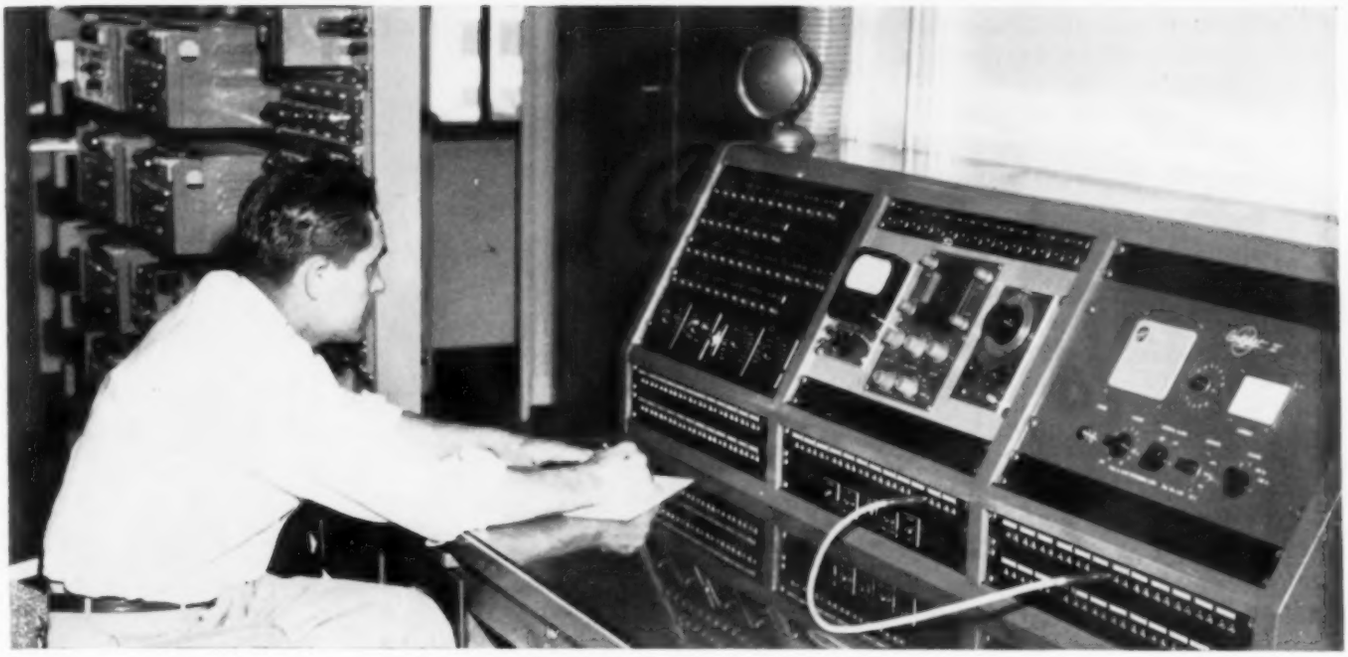


FIGURE 2—Seated at this multiplex test console, Jim Brooks, Platte's microwave supervisor, can take a quick look at operation of the entire system.

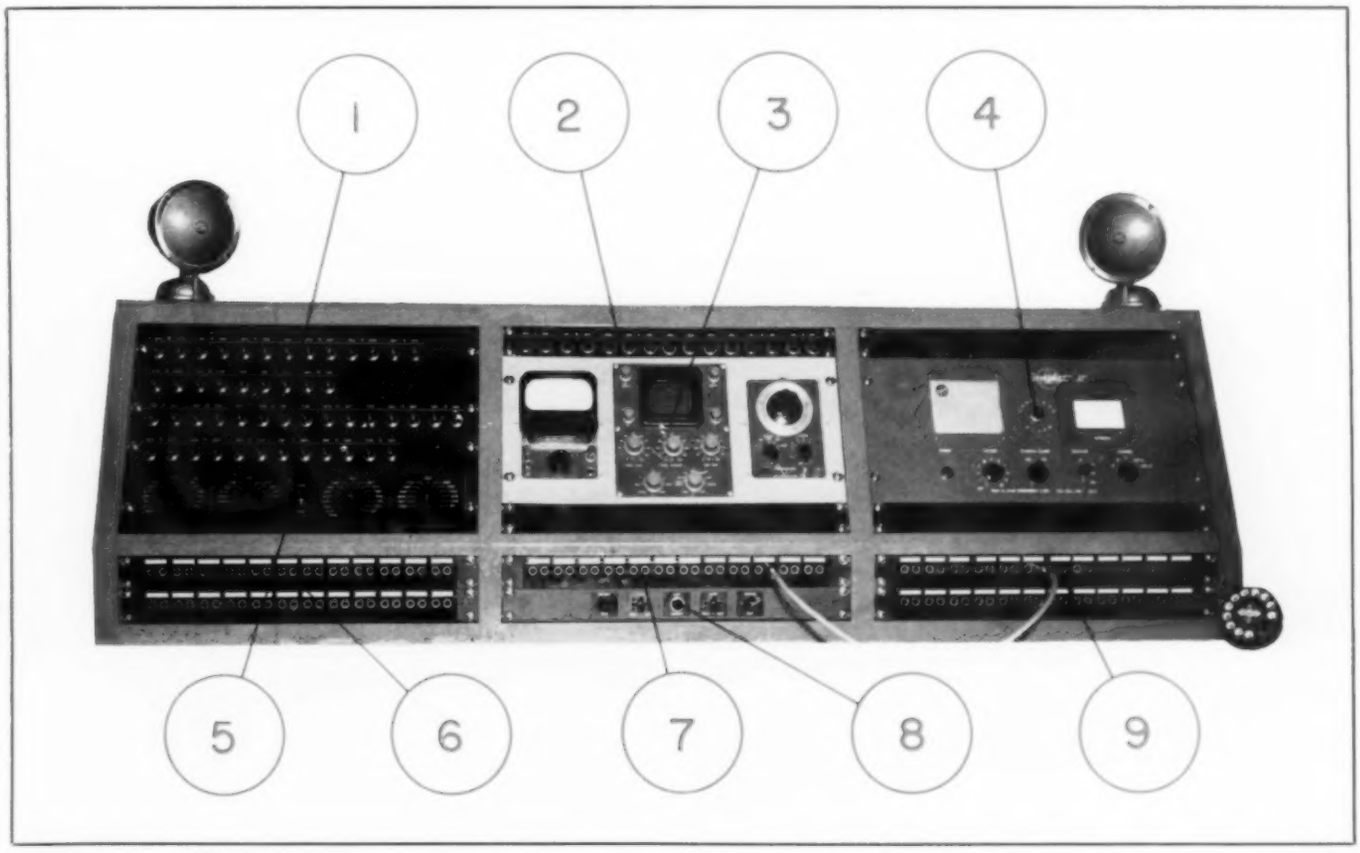


FIGURE 3—Test console concentrates all test functions atop a standard five-foot office desk. 1. Indicator lights for each station on system show by coded signal which repeater is in use; if the tower light is operable; and if emergency generator is running. 2. Light strip panel indicates telemetering activity at 15 main line pumping stations without having to walk to dispatching center. 3. Instrument group includes an audio vacuum tube voltmeter for measuring system volume levels; a three-inch oscilloscope and miniaturized audio volume checks. 4. CONELRAD monitor automatically locks out VHF base stations in event of radio alert. 5. Switch bank facilitates two-way testing of any microwave repeater on system . . . a real time saver in checking the relative condition of any repeater. Switches correspond to each back to back section of the microwave system. 6. Jack field measures relay currents of each fault tone receiver. This unit is especially handy for checking alarm circuitry. 7. Jack strip presents composite of signals in and out of the Kansas City terminal station. Here also are jacks for patching any console test instrument into circuit 8. VHF control panel and indicator lights. 9. Jack strip terminations for all carriers at the Kansas City terminal.

as standby equipment at all times on dummy load; it is automatically transferred instantly in case of primary failure. Since units can be switched upon signal from Kansas City, condition of each one is checked out without a technician in attendance at the field equipment. This standby arrangement virtually eliminates outage time during warm-up. Each station is switched daily during routine checks of condition; also, the field technicians' heavy work-load is better coordinated in this way.

Each of Platte's field microwave technicians maintain more than 150 miles of system constantly. With this big job, quick routine checks from the Kansas City headquarters are particularly valuable in saving travel time and lost motion between regular maintenance calls. Several times men have driven over 2000 miles in a week plus working stopoffs of many hours at some eight microwave stations along the way.

Emergency Power Units Checked Daily. All of Platte's 45 microwave stations are powered from commercial sources; in case of power failure, an emergency gasoline engine powered generator is started automatically to maintain power until normal source is again firm. For maximum reliability, gasoline engines are started daily by a time clock and operated at no-load for 15 minutes.

Spare Microwave Unit Simplifies Maintenance. Platte's technicians have made several adaptations to circuitry on their central station microwave equipment. Signal units in the control room have been converted to plug-in units for easier inspection and repair. In addition, an extra microwave unit has been installed at the twelfth floor control center to save steps when testing out modifications or circuit revisions. Formerly a man had to go back and forth up to the thirty-second floor equipment room. This "guinea pig" unit also duplicates field problems without tying up operational equipment for research.

—The End

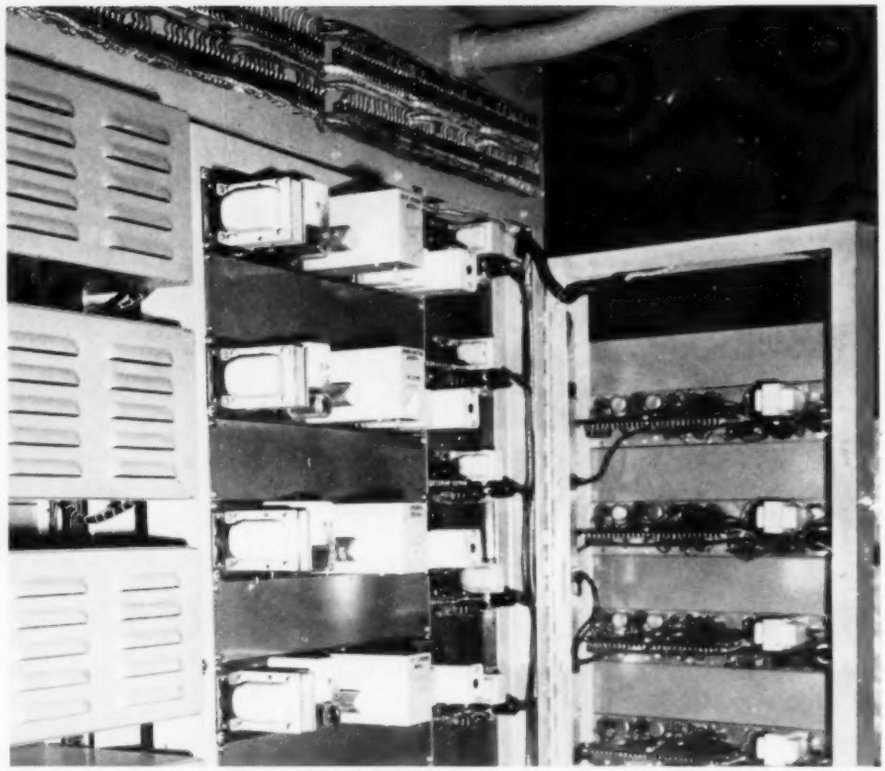


FIGURE 4—Rear view of carrier units (left) and signalling units show how they were modified to plug-in type units. Change greatly simplified maintenance and repair.

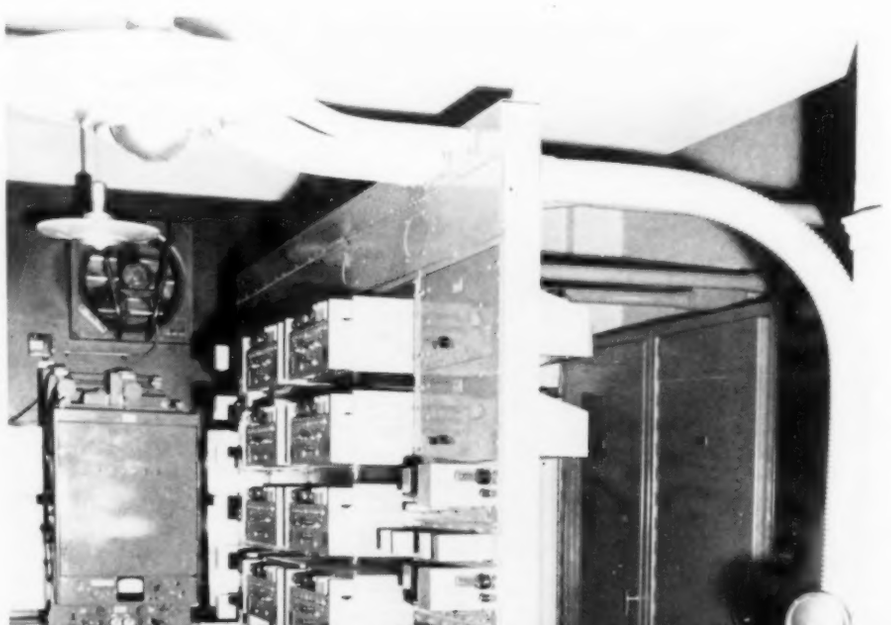


FIGURE 5—Over-all view of microwave carrier and multiplex system. "Spare" microwave unit at left serves as "Guinea pig" for testing modifications and circuit revisions. It faithfully duplicates field problems without tying up operational equipment for testing circuit changes.

Electronic Wizard

'Snooper' Controls Compressor Surges

Unit developed by Texas Eastern communications engineers senses when a dangerous surge condition exists. It then takes corrective action through a preset feedback control system.

By F. VINTON LONG
Texas Eastern Transmission Corporation
Shreveport

THE PROBLEM of controlling dangerous surge conditions in gas pipe lines for several years has been something that somehow always was left to the "other fellow." There has been much research on pulsating surges such as occur around reciprocating compressor stations, but very little about the dangerous and destructive condition which can build up around a centrifugal station. Like the weather, everyone had heard of it, knew very little about what caused it, less about just what actually happened during a surge, and still less about how to control it.

During the summer of 1955, Texas Eastern Transmission Corporation engineers decided to try to find out just what did go on around a centrifugal compressor station before, during, and after a surge condition occurred. Such an investigation was needed because such surge possibilities were an annoyance and a hazard at an attended station. They would create a prohibitively dangerous condition if unattended remote control operation were to be considered. The need for a surge control device was obvious, but hard facts were required to have a tangible target to set up for its design.

First Research Aimed at Surge Behavior. Tests conducted at Texas Eastern's Atlanta, Texas, station in September, 1955, confirmed the engineering thinking as to what could go on at a typical station during actual surge conditions.

The Atlanta station employs four induction motors, each driving a centrifugal compressor. Compressors are connected in series and move gas through the 24-inch line between Longview, Texas, and Little Rock, Arkansas. Motors are rated at 2000 horsepower, 2300 volts, 60 cycle, 3 phase and 3569 revolutions per minute. Compressors are rated at 5525 cubic feet per minute with a 61-pound pressure rise at 3575 rpm.

About the Author

F. VINTON LONG is chief of the communications and control section, Engineering department, Texas Eastern Transmission Corporation, in Shreveport. Long, who served as an AAF communications officer three years, has been in communications positions with Pan American Airways in Latin America and Mene Grande Oil Company CA in Venezuela.

He was also a special representative for Westinghouse Electric International Company and Wilcox Electric Company, Kansas City. Since joining Texas Eastern in 1950, Long has been responsible for design and construction of 1700 miles of microwave radio links for pipe line use.

Pressure Oscillations Measured First. A strain-gage pressure transducer was connected in the No. 4 unit discharge line to study pressure changes. A recorder was used to measure pressure variations during tests. An operator slowly moved the valve in the suction line of the No. 4 unit in the direction of closure. As Texas Eastern engineers predicted, the system developed pressure oscillations when the gas flow through the suction line was restricted. Motion of the suction valve was stopped as soon as the system went into oscillation and the valve was reopened just as soon as a few oscillations had been recorded.

Test Oscillations Dropped Discharge Pressure Sharply. Before making tests, the operation of the compressor was as follows:

Volume = 4500 cubic feet per minute
Temperature = 106° F.
Pressure rise = 41 psi

When the system went into oscillation the discharge pressure dropped from 780 psi to 730 psi and the power input to the motors, with three units in operation, dropped from 4400 kilowatts to about 2500 kilowatts.

Pressure Surge Amplitude Reached 30 Psi. The length of one oscillation cycle corresponds to a frequency of approximately 4 cycles per second. Maximum oscillation amplitude indicated was ±30 psi pressure variation peak to peak.

These first studies provided information about the surge problem and also indicated a possible solution. The best approach was to design a device which would operate on the actual dynamic condition of the gas in the line at the point where it sometimes caused trouble. This meant that a "snooper" or "eye" had to be watching the gas pressure somewhere in the station piping. This "eye" was to be inserted on the discharge side of the station to read the *change* in operating pressure at that point. In other words, a pressure transducer was connected so that operating pressure readings would be of no concern—only the *change* in pressure

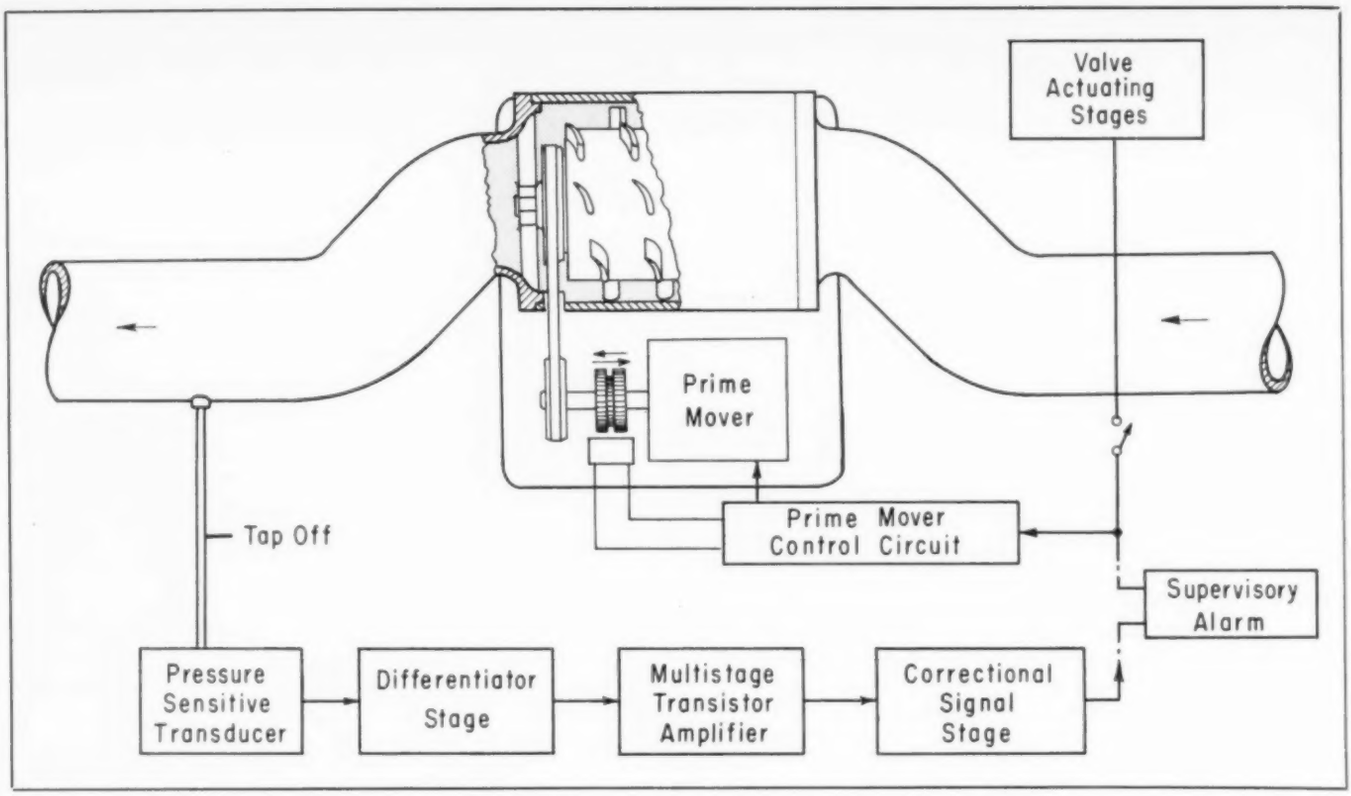


FIGURE 1—Schematic illustrates functional relationship between the centrifugal compressor, electric motor and components of the feedback control system of the pulsation controller. A comparable arrangement might be used for a reciprocating or gas turbine driver.

was desired as an indicating function.

Output from this indicator was brought in to the input of the surge control device. If there was an ordered pressure change the device monitored it but nothing happened, or if pressure even dropped to zero, nothing happened. However, if the pressure started to oscillate, even at low values of only a few pounds, the device sensed this; and if these oscillations were near the established surge frequency of the station, surge control devices would go into action.

Corrective Action Not Taken Until Surge Occurs. By means of a preset adjustment, the "snooper" would withhold action until a predetermined number of pressure oscillations occurred. This insured that an actual surge condition was building up before corrective action was taken. Once a surge condition was detected, the rest of the operation was comparatively easy.

Pilot Model Passed Operating Tests. After initial tests, the first pilot model of the surge control device was constructed. In the summer of 1956 it was tested at Texas Eastern's Atlanta station; its operation proved satisfactory.

Surge Frequencies Measured at Other Stations. Next it was decided to ascertain the surge frequencies and amplitudes of the several types of centrifugal compressor stations employed on the Texas Eastern system. Tests were made at 15,000 hp single unit electric stations, the gas turbine stations, and at the larger multi-unit electric stations which employed several motors of 2500 hp each.

Positive results were obtained from each of these tests; surge frequency was found to range from about 1.5 cycles per second at the gas turbine stations to 70 cycles per second at the large single unit electric stations.

From these results it was predicted that the surge control device was feasible at all types of stations provided that the basic model would have certain engineering changes to adapt it to the inherent surge frequency of the particular type compressor station involved.

Operation of Surge Control Unit Is Precise. Figure 1 shows the interrelationship between a pipe line compressor or pumping station and those components employed in the feedback control system of this device.

Consider the typical gas pipe line with a centrifugal compressor driven by a prime mover. The prime mover may be a gas turbine or reciprocating engine having the ability to rotate the compressor at a speed governed by the response of the prime mover control circuit as directed by the output signals from the correctional signal equipment. Or the prime mover may comprise a conventional polyphase induction motor or other electrical drive. Direct coupling would ordinarily be used.

To signal the periods during which corrective action is taken, a supervisory alarm is connected to respond to the output of the correctional signal stage. In the case of unattended remote stations, the supervisory alarm signal may also be telemetered to personnel at the supervising station.

A prime mover can receive a speed control signal from the feedback control system and can receive an automatic shut-down signal under certain conditions of surge or cavitation.

The tap-off shown at left in Figure 1 is used to sample the pressure within the line on the downstream or exhaust side of the compressor. It is connected to energize a pressure sensitive transducer which produces an electrical signal proportional to the amplitude of the pressure change. The transducer can include a con-

ventional Wheatstone bridge with a strain gage connected in one leg or any device which will indicate a *change* in pressure.

Differentiator Measures Rate of Change. The electrical signal produced by the pressure sensitive transducer is applied to a differentiator stage. This stage has the ability to produce an output voltage proportional to the rate of change of the input signal applied. For example, a conventional multi-turn transformer may be used to produce an output secondary voltage which is proportional to the time rate of change of the primary current.

Output of the differentiator stage is applied to a multi-stage amplifier which may be either a transistor unit or other reliable type amplifier. Electrical output signals from the amplifier are given to a correctional signal stage.

To maintain the stage in a quiescent state during normally occurring transients in the system, a conventional pulse counting reset circuit may be included within the unit. The reset circuit is biased; that is, preset in such a manner as to prevent the delivery of any signal from the correctional stage until the amplitude or frequency of input pulses delivered exceeds a predetermined value. This value is adjustable.

Closure rate of the relay contacts contained in the correctional signal stage must equal or exceed a definite value before any adjustments are made in the operating conditions of the pressurized conduit. By means of this pulse counting technique, the system is rendered insensitive to normally ordered changes in the operating pressure or transient fluctuations. It is therefore able to start corrective action only for real conditions of surge.

Electric Motor Drive Simplifies Control. Compressor stations using constant speed electric motor drive are protected quite simply by means of the recycling or recirculating valve. At these stations the surge control device contactor, shown as part of the valve actuating system in Figure 1, is pulled down when a surge begins; it then starts opening the recycling valve. It will continue to open the valve as long as the surge continues, but will cease the opening process as soon as surge subsides.

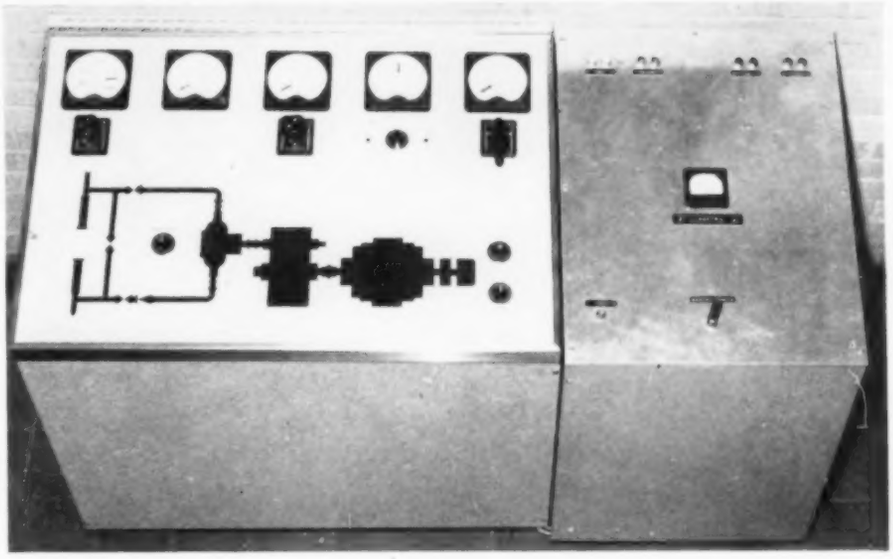


FIGURE 2—Overhead view shows location of surge control unit just to the right of electric compressor station control panel. All control elements of the electronic surge controller are unitized to facilitate maintenance.

After line conditions improve, the recycling valve can be closed, either manually by an operator on duty, or remotely if unattended operation is employed.

Surge Control Could Work on Variable Speed Units, Too. Installations of the device on variable speed prime mover stations such as gas turbines or geared reciprocating engines might be made so that the output of the surge control device would control the speed of prime mover as in a true feedback system.

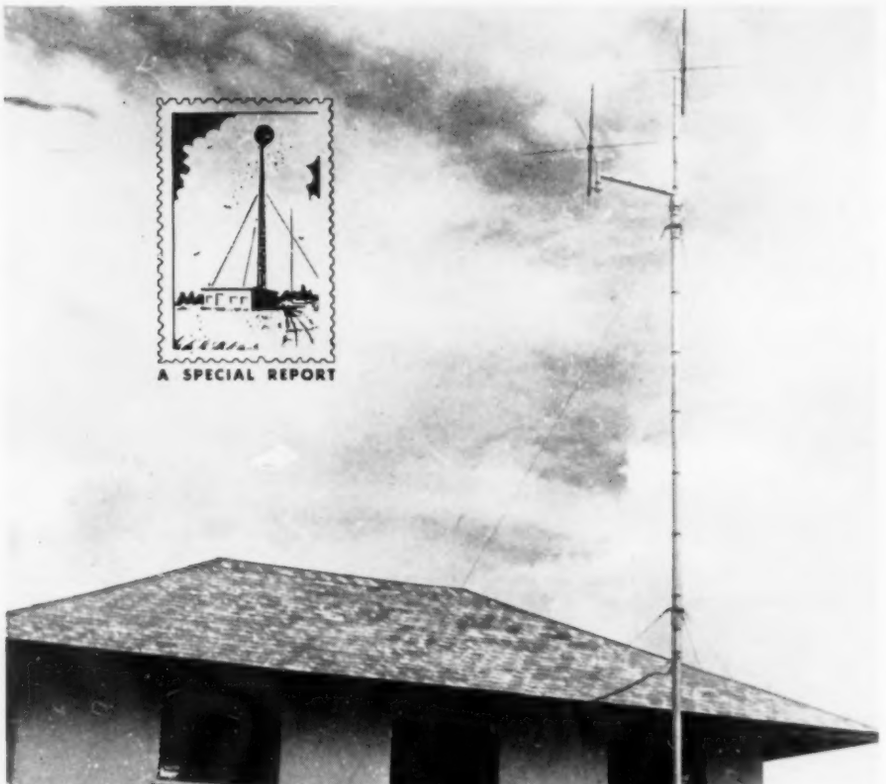
A conventional pulse counting reset circuit is preset to prevent signal delivery from the correctional stage until frequency or amplitude of pulses exceed a set limit. By this technique, the device takes action only during actual surge. Value of settings can be adjusted.

Maintenance and Inspection of "Snoopers" Is Easy. Field tests showed the first development models to require very little maintenance. After a longer period of field operation and further minor improvements it should prove to be a very practical tool for station protection.

Such a device is of value at attended stations as a safeguard against unexpected surges. Also, the pipe line can be operated under critical conditions which, without this safeguard, might make a station shutdown mandatory. A typical example would be when an upstream station must, of necessity, go off the line and thereby starve the input of the next downstream station. Often the company is faced with a decision whether to continue operation of the downstream station in a critical operating condition and on the verge of surge, or play safe and shut it down before a surge occurs. This is especially critical for a constant speed station.

With the constant vigilance of the surge control device watching the pressure changes, the company could, with safety, leave the station on the line and the surge control device would take over immediately if any dangerous surge began to ocur.

The prime function of the electronic surge control device is to try to keep the station on the line and control any surge condition before it gets heavy enough to kick the station off. —**The End**



From this Lutong signal station tanker loading operations are closely controlled for each of the four berths located three and a half miles offshore.

VHF Controls Sarawak Sea Loading Operations

Portable units aboard tanker send pumping orders to shore radio station. Coded emergency signal shuts down pumps remotely.

TANKERS LOADING FROM a sea terminal three and a half miles off Lutong, Sarawak (British Borneo), utilize a submarine pipe line loading system controlled by a highly flexible radio link. Seven portable radio units are maintained for service aboard docking tankers to communicate with shore facilities. Cost of the entire installation is only $28,000.

Operation of the control system is both simple and efficient. Tankers standing into the Lutong sea terminal pick up their pilot several miles down the coast. When a pilot boards the tanker he brings along a portable radio unit from the pilot boat. As the ship nears the berth, portable equipment is set up and communications are checked out with the shore station. At this time arrangements are made for emergency pump control channels.

The Lutong refinery, owned by Sarawak Oilfields Limited, processes crude oil from the Seria field in Brunei. The sea terminal comprises four offshore berths connected by manifolding and submarine line to the shore pumping station. Centrifugal pumping units are driven by seven gas engines and five diesel units. Instant communications are required to handle normal operations and to take quick action in case of emergencies such as burst of delivery lines or pressure surges.

Emergency Signals Provided Each Tanker. Four emergency pump control signalling tones are available, one for each berth. They are selected by a four-position switch on the portable unit. Emergency signals are therefore distinct for each of the berths; there is no interference between ships.

Shore facilities include a transmitter-receiver station at Lutong controlled by the shore operator; a receiver is located also at the pumping station. Mobile stations operate on the

Shipboard radio units are taken aboard with the pilot. From a central location outside the captain's cabin, instant communications are maintained with shore pumping units. One wooden case contains control unit and handset; the other stows cables, aerial, and a rotary converter unit which supplies 12 volt DC from normal ships power.

Signal control panel in the Lutong shore station relays emergency shutdown signals to pump station.

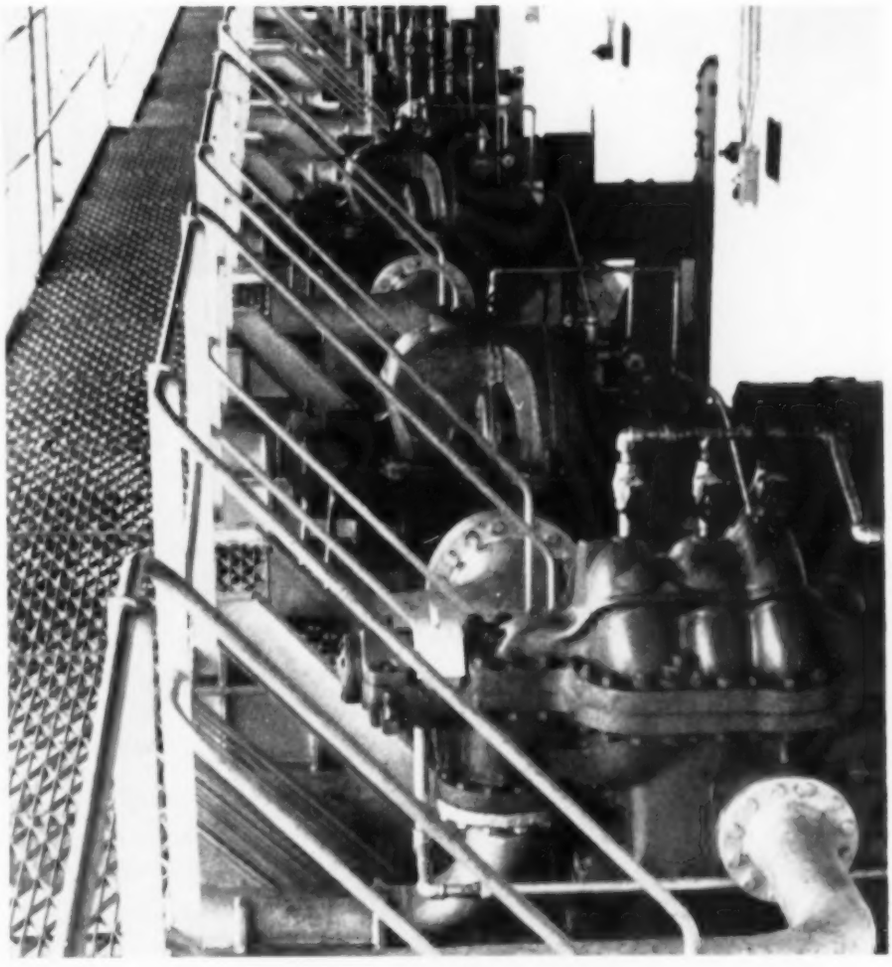
Operator selects proper circuit to start up engine driven pumping units that deliver products to sea terminal berth.

simplex principle with a press-to-talk button on the handset which switches on the carrier wave. Carrier wave of the emergency channel is switched on directly when the emergency button is pressed; it is modulated by one of the four signalling tones. The receiver of the mobile unit is tuned to the shore transmission channel which has a decoding unit that responds to just the one calling tone.

When it is received, the decoding unit sets a bell to ringing. Main set and remote control units have a handset and bell, but only one operates depending upon the setting of a local/remote switch on the main unit. Emergency control can be operated at both positions, simultaneously if necessary.

Radio telephone channels are fixed frequencies, 80 mc for mobile stations and 86 mc for the shore station. Emergency signals are transmitted on 80.2 mc. Mobile units also have loudhailing equipment and a remote control device which allows the equipment to be operated at a distance up to 300 feet from the main set. It works off 12 volt DC power supplied by a rotary converter from the ship's 110 volt supply or by heavy duty batteries.

"Packaged" Units Are Portable. Equipment is crystal controlled and amplitude modulated. Mobile sets are handled in carrying cases. One con-



Shore pump station houses sea loading pump units—seven gas engine driven and five diesel units. Manual emergency stop buttons are located on firewall above each pump.

Announcing

THE NEW PIPE LINE COMPOSITE CATALOG

The publishers of PIPE LINE INDUSTRY take pleasure in announcing a new, specialized catalog service for men engaged in pipe line operations, maintenance and construction. The new publication will be a composite file of catalog data from companies selling their products or services to:

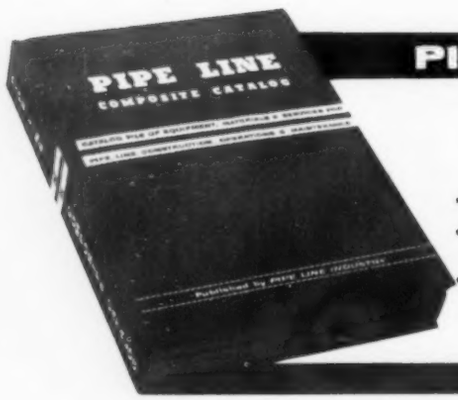
- Crude Pipe Line Companies
- Products Pipe Line Companies
- Gas Transmission Companies
- Pipe Line Contractors
- Engineering-Design-Construction Firms

The PIPE LINE COMPOSITE CATALOG will be a case bound book, indexed and cross-indexed by company and by product or service. It will contain the complete or condensed catalogs of manufacturers and service companies serving the pipe line market.

ENTHUSIASTIC INDUSTRY ACCEPTANCE

When the plan to publish this new PIPE LINE COMPOSITE CATALOG was presented to 3,500 pipe line men, they responded with overwhelming approval of the idea. More than 97% of the men answering the survey said they would prefer such a catalog, will use it and want a copy when published.

For further information concerning the new PIPE LINE COMPOSITE CATALOG, contact any of the Gulf Publishing Company offices listed below.



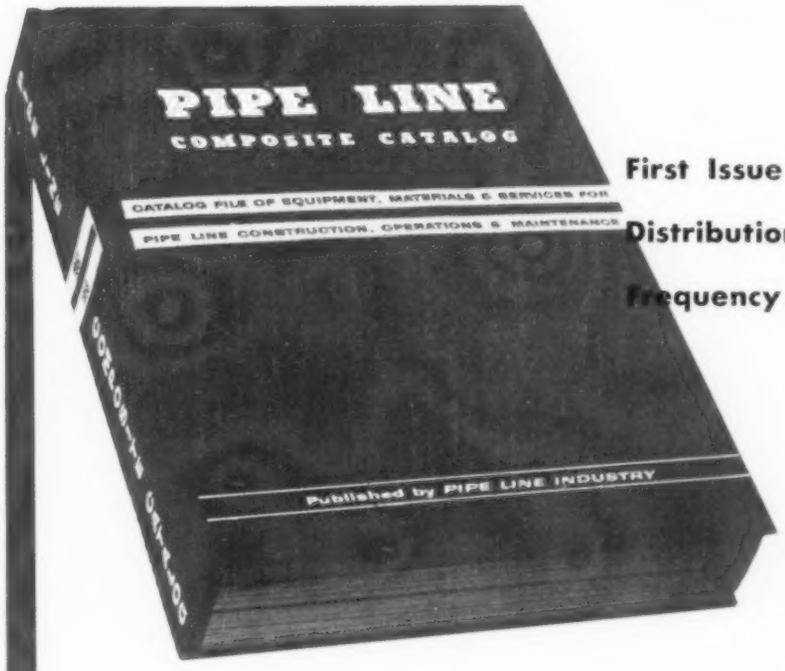
PIPE LINE COMPOSITE CATALOG

Specialized **PETROLEUM** *Publications*

- **Houston (19),** 3301 Buffalo Drive, JAckson 9-4301
- **New York (17),** 250 Park Avenue, YUkon 6-6558
- **Chicago (4),** 332 S. Michigan Avenue, WAbash 2-9330
- **Cleveland (15),** 1010 Euclid Avenue, MAin 1-3295
- **Tulsa (3),** 916 Enterprise Bldg., CHerry 2-9211
- **Dallas (1),** 518 Santa Fe Bldg., RIverside 7-7344
- **Los Angeles,** W. W. Wilson Building, Huntington Park, LUdlow 7-1219

A New Service FOR BOTH

BUYERS AND SELLERS OF PIPE LINE EQUIPMENT


PIPE LINE
COMPOSITE CATALOG
CATALOG FILE OF EQUIPMENT, MATERIALS & SERVICES FOR
PIPE LINE CONSTRUCTION, OPERATIONS & MAINTENANCE
Published by PIPE LINE INDUSTRY

First Issue . . . . . **July, 1957**

Distribution **4,000**

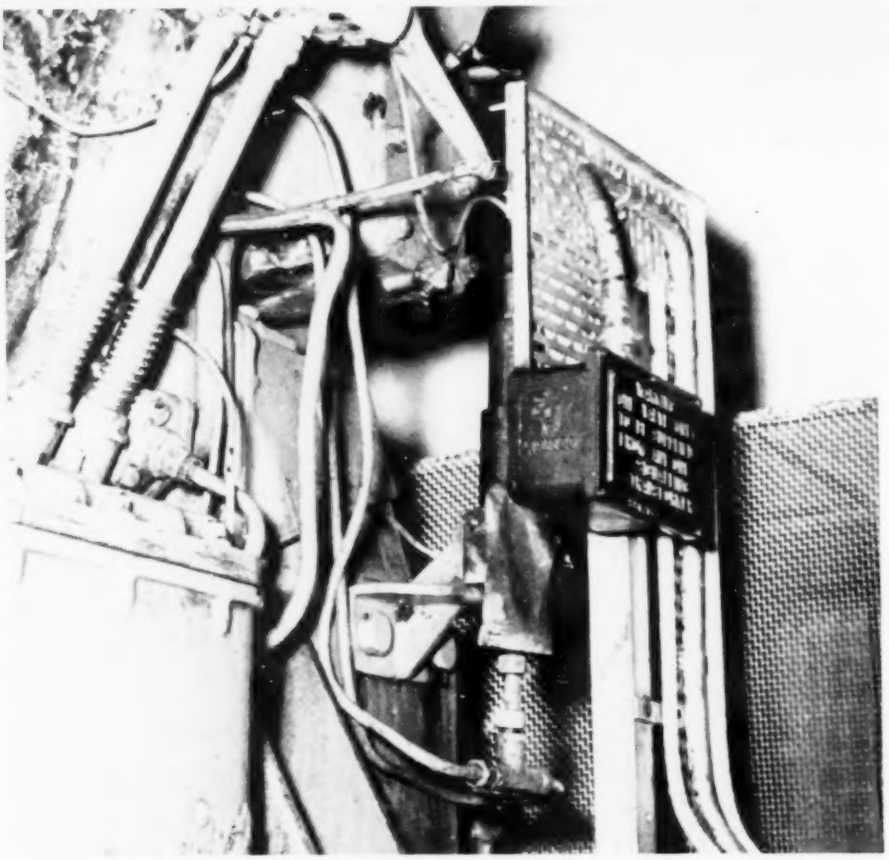
Frequency . . . . . **Every 18 Months**

Another Gulf Publishing Company service for the oil and gas industry.

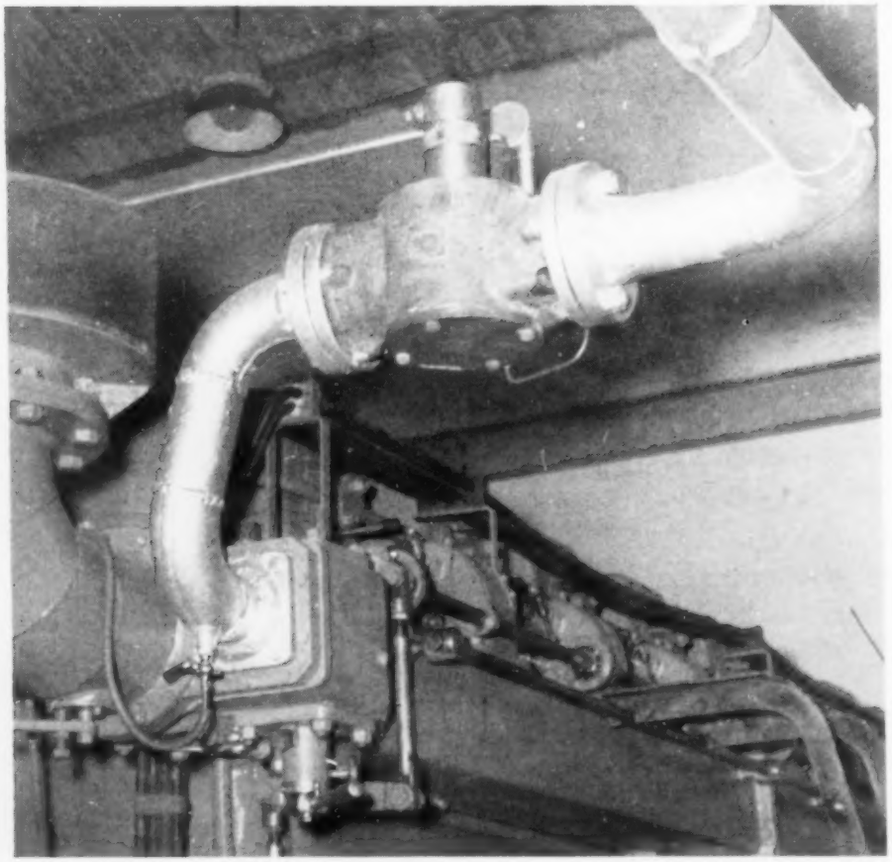
IF YOU BUY EQUIPMENT OR SERVICES

Be sure to watch for the first issue of the new PIPE LINE COMPOSITE CATALOG. Ask your supervisor to check with your company management to see if your name is among those which your company has submitted to us to receive a personal copy of the new PIPE LINE COMPOSITE CATALOG.

Full of job-help material. The Catalog will contain specifications and engineering data actually supplied by the manufacturers, service companies and suppliers serving the industry. For fast, convenient, comprehensive help in your job, make sure a copy is available to you. It will make your buying or specifying job easier.



Emergency shutdown of diesel pumping units is actuated by this solenoid and oil pressure shutoff switch. An electric valve shuts off lube oil pressure feed to a standard oil safety shutoff.



Gas engines are shutdown upon receipt of an emergency signal; an electric valve operator admits compressed air to a three-inch valve in the fuel gas supply line.

tains the control unit and handset; another the aerial, cables and rotary converter.

Signals Cut Off Fuel Supply. At the Lutong pump station two receivers in parallel are tuned in to the emergency channel of 80.2 mc. Each has a decoding unit for the four emergency call signs. When a signal is received it activates the appropriate relay operating the tripping gear to stop fuel to the pump's engine driver.

When this happens, a bell rings to indicate that an emergency signal has been received so that an attendant can reset the relays. Any defect in the receiver is shown by an indicating light. Troubles are investigated at once. Receivers are equipped with meters to facilitate checking out circuits. Any breakdown in one receiver automatically causes the other to take over receiving the emergency signals.

How Emergency Engine Shutdown Works. Receipt of the emergency signal closes a relay in the emergency receiver in the pumphouse. This sends current through a selector switch box to solenoid trip coils in each of the engine fuel supply valves pumping to the tanker involved. Fuel valves are released and close sharply by spring action.

In diesel engine units, the signal simulates lubricating oil failure; an electric valve shuts off a lube oil pressure feed to a standard oil safety shutoff. On gas engines, the electric valve operation permits compressed air flow to an air-operated 3-inch valve inserted into the engine fuel gas line. Solenoid operated control valves in the pumphouse are fail-proof.

Main power for such uses as loud-hailing is fully enclosed in remote flameproof enclosures. Circuit shorts in control panels or solenoid valves cannot ignite vapors in the pumphouse.

Emergency Signal Cuts Out Normal Ship-Shore Communication. When ship's radio equipment is in normal use, pressing of the emergency button automatically cuts off the ordinary transmissions to relay the emergency signal. If two ships were to signal an emergency at the same time, both relays in the pumphouse would operate; but as a result of beat frequency, other pumps might also be shut down. —**The End**

FIGURE 1—Well-point system on Rio Grande crossing permits excavation to proceed in vertical stages. Sandbags were used to help establish end of trench nearest north bank of river. Nearly 4000 feet of well-points may be used on the job before completion.

This 422-mile construction job is encountering such obstacles as sand dunes and six-mile stretches of water. One interesting difficulty has been made easier as Texas Eastern's

Pipe Line Crosses The Rio Grande On Dry Ground

By RALPH C. HUGHES, Jr.
PIPE LINE INDUSTRY Staff

FOR A SECTION generally considered "powder" dry, South Texas has offered several water hazards for inspectors and contractors to overcome on Texas Eastern Transmission Corporation's new line. Of the 422-mile main 30-inch line, almost 22 miles are watercrossings of bays or rivers. Brown & Root, Inc., Shreveport, La., is handling the field supervision and inspection on the project.

The Rio Grande crossing being made by H. B. Zachry Company

FIGURE 2—Draglines, working north from river, bring trench to grade gradually. The excavation calls for approximately 3800 feet of ditch (including the river bed) to accommodate the dual 20-inch lines. Pumps are discharging seepage water over end of cut, shown in Figure 1, into the river.

Rio Grande crossing made with dragline—and on dry ground

FIGURE 3—Water level is encountered when excavation drops below effective zone of the protecting system of wellpoints.

FIGURE 4—Dragline set additional system to dry out sand and allow succeeding stages to reach design grade. Job called for some 42 feet of cover on the banks for over 3000 feet and approximately 10 to 20 feet of cover in the river bed.

near McAllen, Texas, is especially interesting:

- Nearly 1 million cubic yards of dirt is being moved. Standard earth moving equipment is being used with no dredge on job-site.
- Two 20-inch lines are laid in a common ditch—25-feet center-spacing.
- The crossing spans the international boundary between the U. S. and Mexico, bringing Mexican gas into the U. S. for the first time commercially.

The two lines are laid to grade for some 3500 feet, with 42 feet of cover on the banks and about 20 feet of cover in the river bottom. The river bed itself is only 200-400 feet wide at the point of crossing. The grade was carried 900 feet into Mexico and 2600 feet into Texas to avoid future washouts by the meandering Rio Grande.

To avoid excessive land damage, the first two feet of top soil was "stripped" off and piled separately, to be replaced after rest of the back-filling is completed. The remainder of the earth work is performed by draglines.

20 feet below river bottom

FIGURE 6—Equipment to perform excavation of river bed and 700 feet of trench on the Mexican side is transported across diversion channel on bridge built by contractor. From the tie-in island, traffic reaches the south bank over the upstream diverting dam.

FIGURE 5—After two 700-foot strings of pipe are laid at the south end of excavation (Figure 1), the line is back-filled. A bell-hole is left for tying the two lines into the river bed crossing when it is completed. River is dammed above crossing and a diversion channel cut over the back-filled sections. The channel is brought back to the river downstream from the crossing which leaves the tie-in island connected to the south bank by the diverting dam and to the north bank by the equipment bridge.

FIGURE 7—Dragline and other earth moving equipment starts excavation on south bank of river. As soon as water level is reached, the downstream dam will be completed thus isolating the crossing and allowing the river bed and rest of trench to proceed as shown in Figures 1 through 4.

Draglines Work Below Water Level. Working some 20 to 30 feet below the water level, these units are aided by an extensive system of well-points. As the excavation progresses, the well-points lower the water level and dry the sand bed out, gathering the seepage water from hundreds of small "water wells" and discharging it back into the river. Moretrench Corporation, Houston, contracted the well-point system.

The original excavation amounts to some 400,000 cubic yards of earth to which is added:

- The construction of a bypass "diversion" channel for the river. This was completed on the Texas bank, (50,000 cubic-yard excavation) over the first two 700-foot strings of pipe laid. By diverting the river and damming off the crossing itself, the entire crossing will be completed as described above.
- Construction of a private bridge

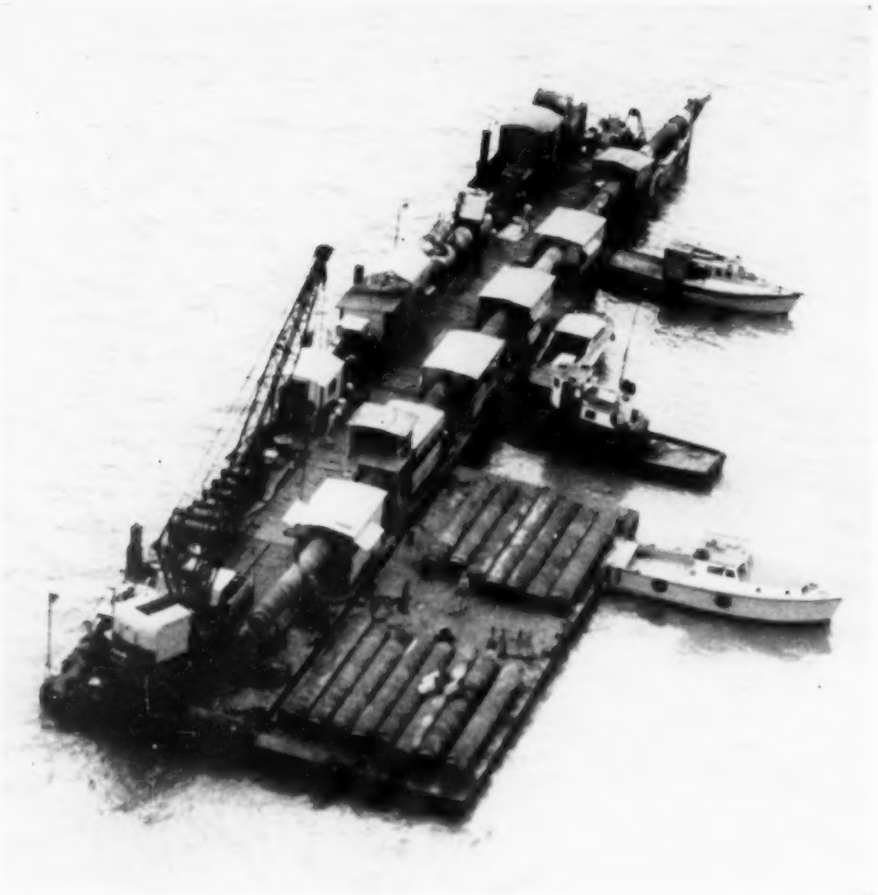


FIGURE 8—Western Pipe Line, Inc.'s pipelaying barge installed over 31,000 feet of 30-inch concrete weighted pipe in the crossing of Lavaca Bay. Calm weather such as this was at a premium on long exposed stretches of the bay.

over the diversion channel for transportation of the men and equipment. The entire crossing is isolated from the International bridge a mile upstream and has its own Customs officials on the Texas and Mexican side.

- Return of the banks and channel to its original state.

With the replacement of all backfill, the total earth moved will approximate 1 million cubic yards—400,000 cubic yards primary cut plus 50,000 cubic yards diversion channel, both to be removed and replaced. The two feet of top soil will be backfilled separately.

Over Five Miles of Bay. The Lavaca Bay crossing, installed by Western Pipe Line, Inc., near Port Lavaca consists of more than 31,400-feet of "submerged" pipelining. Included in this crossing was the difficult task of reaching grade below the Corpus Christi ship channel while going under two foreign gas lines. This task, although not a new one, was not easy with a 30-inch concrete weighted line. The line had to be pulled under the gas lines, without interrupting their operation.

FIGURE 9—Tie-in being made by Western Pipe Line, Inc. crew. Line with bull-plug was section pulled under the two foreign lines in Lavaca Bay.

FIGURE 10—Right-of-way 'dozers of H. H. Null Pipe Line Contractors start leveling sand dunes on Padre Island. Two miles of the 12-inch spur line crossed this desert-type terrain.

Desert Pipelining. A 12-inch lateral line to gather gas from the fields on Padre Island gave H. H. Null Pipe Line Contractors some desert pipelining within sight of the Gulf of Mexico. The 27.7 miles of 12-inch line had four miles of water crossing under Laguna Madre and two-miles of sand dunes on the island. After right-of-waying, a large "plow" was used to ditch for the concrete weighted line. The laying was done by conventional methods.

Mexican Gas Crosses San Jacinto Battleground. Brown & Root, Inc., installed the crossing of Houston's Ship Channel, with dual 30-inch lines. The pipe was concrete-coated to total weight of 555 pounds per foot and set to a grade under the channel 50 feet below the water level. The 30-inch line carrying Mexican gas crosses the San Jacinto Battleground close to the San Jacinto monument. Total length of the crossing was nearly 2000 feet.

The completed 30-inch line will connect Texas Eastern's 5700-mile pipe line network with a line being built by Petroleos Mexicanos to the international border. —**The End**

FIGURE 11—San Jacinto monument towers in background as Brown & Root, Inc. prepares to pull two 1400-foot strings of 30-inch pipe across the Houston Ship Channel.

USE CAUTION near rock walls and ledges. These are favorite sunning places for snakes of all varieties.

GOOD VISIBILITY is important. Here workman stays to center of road—out of striking range.

Snakes Alive!—Or How Pipeliners

With Spring here, snake bite treatment and prevention takes on added emphasis. For personnel working in the field, specialized safety training is recommended to avoid painful injury and costly lost time.

ACCORDING TO THE U. S. Bureau of Labor Statistics for 1952, fatalities due to the bites of poisonous snakes and insects were 2.5 percent or more. Bites by venomous snakes, whether they occur on the job or not, are obviously more serious than the ordinary compensable industrial accident —and are more frequently fatal.

Analysis of snake bites is vital in analyzing the safety problem:

HOW BITES OCCUR

63% Stepping on or near snake
27% Picking up objects
6% Catching or handling snakes
3% Reaching under objects
1% While sleeping

Venomous snakes in the U. S. fall into four broad categories:

1. Rattlesnakes
2. Cottonmouth or water moccasin
3. Copperhead
4. Coral snakes

The first three are classified as "pit vipers" because of a shallow opening, or pit, on either side of the head between the eyes and the nostrils. Harmless varieties of snakes outnumber the venomous ones in almost all localities.

Follow These Safe Practices. This entire subject might be summed up in one sentence: Do not place any part of your body in a position where it could be within striking range of a poisonous snake if one were there.

Here are some of the more common safe practices and the reason behind them.

Walk on high ground when on country roads, paths, and trails. If brush, logs or stumps line the side of the road, avoid them by five feet or more if possible. The reason for this is that the striking range of a snake is about two-thirds of its length forward or about one-third upward. Since pit vipers rarely attain the length of seven feet, a five-foot clear-

WHEN DESCENDING a pole, don't step on ground until you are confident area is clear of snakes.

Can Stay That Way

ance places you approximately six inches beyond the snake's striking range. In Gulf states rattlesnakes may grow to a length of seven feet.

In Figure 2, the workman has good visibility and can see both sides of the road before he comes abreast of the spot where the snake is located. If he were walking in the wheel rut and the snake should strike upward one-third of its length, it would strike well above the boot tops and reach the knee or thigh. The knee and thigh are larger than the lower part of the leg and provide a larger, easier to hit, target. At this point of the body there is also less clothing to penetrate and it fits more tightly to the body. The upper leg area, being nearer the trunk, is more difficult to treat and the bite is more likely to be fatal.

Watch where you walk when it is necessary to follow narrow trails and paths. Keep away from clumps of grass, brush, or other cover surrounding the path. In dense brush, wear boots. While heavy brush to some extent reduces the chances of the snake's making a direct hit, it also increases the possibility of stepping on a snake by decreasing ground visibility. A walking stick or similar object may be used to probe areas where snakes may be hidden, since snakes will strike at a stick as readily as at any moving object.

Do not step over an obstacle such as a fallen tree, branch, or log in the path. A poisonous snake lurking under the log would have a perfect target. Even if visibility is good on the side of the approach, you cannot see what is on the other side.

First, step up on the log, thus automatically clearing it on both sides by at least two feet. From this point you have clear visibility on the far side before stepping off. This practice should be followed in shallow water and on swampy ground as well. Snakes bite just as effectively under water as they do on land, although they cannot strike as far or with as much force due to the resistance of the water.

Where there are likely to be cottonmouth moccasins, do not paddle or row a boat any closer to stumps or partially sunken logs than you would walk on land. Do not put your hands in or around such obstacles unless you are absolutely sure there are no cottonmouth moccasins in the area.

Do not tie up to these obstacles. Keep your eye on any low tree branches overhanging the stream or pond. Do not step ashore until you have sighted a clear spot of ground upon which to step safely. Look your boat over carefully before stepping into it. Do not wash your hands or clean fish on banks of streams or ponds. The cottonmouth moccasin is especially attracted to marine life for feeding. All snakes are good swimmers. They will frequently board construction barges, offshore rigs, or small boats, looking for a place to rest.

When leaving your truck or car, do not step out onto the ground before looking around. If you have a choice, park on hard ground or clear surface, or at least choose a spot to step out on before leaving the car. Make sure that the windows are rolled up at least three-quarters of the way and that the doors and trunk of the car are closed. Snakes have been known to crawl into cars left by workmen and make their presence known at a rather inopportune time.

With open-body trucks such as a pick-up, pole, or linemen's trucks, use the precautions as you would on the ground in snake inhabited areas. Be especially careful when looking for or handling tools and rigging. Keep tool boxes and cabinets closed when they are not in use. In one instance, a lineman returned on his truck to find that over the weekend a snake had used his open tool box and the rough objects therein to assist in the process of shedding its skin. Fortunately the snake departed, leaving its cast-off skin behind.

Do not walk close to high banks, rock ledges, rock walls, overhanging

GASO HORIZONTAL TRIPLEX PLUNGER PUMP

FIG. 3466—2½" TO 3½" x 4"

MAXIMUM SPEED: 250 R.P.M.

MAXIMUM CAPACITIES AND PRESSURES:

91 Bbls. per Hour at 1180 p.s.i.
179 Bbls. per Hour at 600 p.s.i.

A NEW GASO MODEL

GASO'S Figure 3466 Horizontal Triplex Plunger Pump is a rugged 4" stroke high speed single acting plunger power pump for use where moderate capacities and medium to high pressures are required for crude oil gathering systems, movement of refined petroleum products, salt water disposal, water flooding and fresh water supply.

These pumps are available in complete skid mounted pumping units with gas, gasoline, or diesel engines or electric motors of various makes to suit the customer's preference. Horse power requirements will vary with pump speeds, plunger sizes, and working pressures. Consult our sales and engineering staff for recommendations and suggestions. Each unit will be properly engineered to suit your needs.

Construction Features of this pump emphasize simplicity and strength, a minimum number of parts, and easy maintenance.

The Power Frame is a high strength close grained grey iron casting, fully enclosed. All moving parts in the power end are self lubricated by splash system from oil in the crank case.

The Crank Shaft is a heavy alloy steel casting riding in large tapered roller bearings, 3" I. D. x 7½" O. D. x 2¼" wide, mounted in each side of the power frame. One end of the shaft extends to the outside of the power frame for mounting V-Belt sheave or coupling. This permits the driving power to be transmitted directly to the crank shaft. This shaft extension is 2 15/16" diameter and can be from either side of the pump.

Connecting Rods are steel castings with renewable babbitt lined steel shell bearings 3¾" I. D. x 3" wide in crank end, and bronze bushings 2" I. D. x 3" wide in the crosshead end.

Crossheads are cylindrical type semi-steel castings 7" O. D. x 7" long with outer surface ground and polished and lube-lok coated. The crosshead pins are hardened and ground steel pins, 2" diameter.

The Fluid End Body is a single piece casting. Molybdenum alloy iron is standard for crude oils, petroleum products, and fresh water. Aluminum bronze alloy is standard for salt water. Cast alloy steel bodies can also be furnished when special safety specifications demand it.

Cylinder Heads and Valve Chamber Covers are interchangeable. They are either alloy cast iron or aluminum bronze alloy, same as standard fluid end bodies. "O" Ring gaskets are used with these parts.

Standard Plungers for crude oil service are alloy steel, and for salt water service are bronze or stainless steel. Ceramic plungers and hard colmonoy surfaced steel plungers are also available on special order. Regular plunger sizes are 2½", 2¾", 3", 3¼", and 3½".

Fluid End Plunger Stuffing Boxes are sufficiently deep for receiving various types of standard packing rings for pumping ordinary self lubricating fluids. When necessary, the pump can be equipped with a force feed lubricator and special packing sets for plunger lubrication.

The Packing Glands are either alloy iron or aluminum bronze alloy castings. Three studs and nuts for each gland provide for even take-up.

Valve Assemblies for suction and discharge are interchangeable. Standard equipment consists of stem guided Durabla stainless steel valve discs and hard bronze seats or cast iron seats.

Dual 4" 150# ASA Suction Flanges and dual 2" 600# ASA Discharge Flanges provide for pipe connections to both sides of the fluid end.

Net Weight of pump is 2150 pounds.

GASO PUMP & BURNER MANUFACTURING CO.

Main Office and Plant: **902 EAST FIRST STREET, TULSA, OKLA.**

Export Office: **149 BROADWAY, NEW YORK, N. Y., U. S. A.**

EXCLUSIVE DISTRIBUTORS:

Shreveport, La.—W. L. Somner Co.
Odessa, Texas—W. L. Somner Co.
Brookhaven, Miss.—W. L. Somner Co.
Tinsley, Miss.—W. L. Somner Co.
Long Beach, Calif.—Power Pumps, Inc.
Houston, Texas—Peddlers, Inc.
Wichita Falls, Texas—Pump Engineering Co.
Evansville, Indiana—Hague Equipment Co., Inc.
Casper, Wyoming—Lufkin Foundry & Machine Co.
Edmonton, Alberta, Canada—Lufkin Machine Co. Ltd.

ledges, or high places where a snake may be resting. A strike or bite by a large poisonous snake on the head, shoulders or trunk is almost always fatal.

Do not jump across streams or ditches unless you have good visibility and can select a good-size clear spot of ground on which to land. An employe of a geophysical crew for an oil company made such a jump without looking—then midway in his jump he saw that he was going to land on a spot where several snakes were sunning and he instinctively tried to change his direction. As a result, he lost his balance, fell into the snakes, and was bitten several times. Fortunately, quick action on the part of his fellow crew members in getting him to a hospital saved his life.

Do not sit on stumps, fallen trees, or rock and stone walls without carefully looking over the spot as well as the vicinity immediately adjacent to it.

Wear gloves if it is necessary to pick up small flat objects such as boards or chunks of wood by hand. Stand in such a position that a poisonous snake under the object could not strike out at your feet and legs. Stand behind the object, facing the direction of the end which you are to lift. Lift the end of the board, or piece of wood, with the tips of the fingers without allowing them to reach under the object. A better hold may be obtained after you are certain there is no snake.

Do not attempt to pick up larger objects from the center, such as logs, long boards, lengths of pipe, or poles. Go to the end of the object where you can see both sides, use a stick to clear the debris from around it, and then lift it. In this way you will be able to see both sides and underneath clearly.

Never use your hands—particularly your bare hands—if a tool is provided for the job. When handling straw or grass cuttings, it is safer to use a pitch fork. Coral snakes are a burrowing type and are found under logs, rocks, decaying leaves, and grass piles. A yardman, putting grass cuttings into a wheel-barrow, found a coral snake firmly attached to his index finger after having dropped the cuttings into the wheelbarrow.

When working around rocks, rock outcroppings, or stones remember that poisonous snakes such as the timber rattler which inhabits such areas, may be hidden there. Use a stick or tool to separate or roll stones clear before picking them up, and wear gloves.

Never put your hands on rock ledges or rock walls, especially when climbing. Ledges and crevices are very likely places for rattlesnakes and copperheads to sun in spring and fall. Do not put your hands down unless you can see all around the spot and make sure there is not a snake in sight.

Never put your hands into a hole in the ground or a hollow log. These places are ideal shelters for snakes. If you must investigate, use a long stick and prod gently. You can soon tell whether or not there is anything alive inside.

Pipe line construction crews should be particularly alert when starting to work in the morning, especially around ditches and holes that may have been dug and left open for several days. Snakes may have fallen into these holes or ditches during their nocturnal ramblings in search of food.

Sleep in your car or truck if your work requires sleeping or camping out. Keep the doors closed and windows rolled up three-quarters of the way. Do not sleep on the ground in areas where there may be snakes if you can avoid it. If you must camp on the ground, set up a mosquito bar and tuck the netting well under the bedding; this will provide some protection from inquisitive snakes.

Do not make your camp where there are brush piles, rock piles or wood litter. Such sites may shelter snakes and their prey. Do not gather firewood after dark; even with a strong flashlight, you cannot see all around the places where you are putting your hands.

Linemen checking poles should be cautious before ascending. Walk around the pole first, and carefully look over the ground area. What is on the ground may be just as dangerous as a rotten pole. When descending a pole, before taking the last step onto the ground look the situation over again. It may have changed since you went up.

Never start horseplay with a dead snake or use one to scare a fellow worker. Do not cut the rattles off a freshly killed snake as a souvenir. If you feel you must, be sure that your heel is firmly pressed on the back of the neck between the head and the body.

For safety's sake, however, it is best not to touch a freshly killed snake. Freshly killed and decapitated snakes behave in a manner indicating a belated reflex action. The head may be completely severed from the body and still be dangerous. If one should grab the neck an inch or so below the severed head, the head might turn and bite in exactly the same manner as if it were attached to the live snake, and just as effectively. As long as there is venom in the venom gland and the fangs are attached, this venom can be discharged.

Keep your eyes and ears open. The cottonmouth moccasin, copperhead and coral snakes have no rattles, so you must be alert and depend upon your eyesight. Small rattlesnakes shake their tails just like the big ones but make no more noise than the buzzing of a bee. Even large rattlesnakes cannot be depended upon to sound a warning, as their rattles might be under a coil or broken off in the course of their wanderings. On drizzly or rainy days water frequently fills the spaces between the rattles and the rattling sound cannot be made or the rattlesnake may not choose to sound his rattle.

Should you come upon a snake suddenly or hear a rattle, stop and remain immobile until you determine the kind of snake it is and where it is located. By remaining perfectly quiet until you can locate the snake or identify it, you may save yourself further trouble. Do not become panicky and try to jump or run. Running or jumping may lead you into more danger.

If the snake is stretched out in a crawling position or is in a pancake coil resting, you may safely step out of range before the snake can assume a striking coil. The striking coil is best described as an open loop on the ground, head and neck raised in "S" shape, poised to strike. The snake doesn't have to be in a striking position to bite, but unless coiled it cannot reach very far. Snakes strike mainly at moving objects. They can strike, recoil and be ready to strike again in one-half second.

Snakes do not travel in pairs as many believe; but in areas where there is one snake, there is reason to assume that others are nearby.

GASO HORIZONTAL TRIPLEX PLUNGER PUMP

FIG. 3466—2½" TO 3½" x 4"

MAXIMUM SPEED: 250 R.P.M.

MAXIMUM CAPACITIES AND PRESSURES:

91 Bbls. per Hour at 1180 p.s.i.
179 Bbls. per Hour at 600 p.s.i.

A NEW GASO MODEL

GASO'S Figure 3466 Horizontal Triplex Plunger Pump is a rugged 4" stroke high speed single acting plunger power pump for use where moderate capacities and medium to high pressures are required for crude oil gathering systems, movement of refined petroleum products, salt water disposal, water flooding and fresh water supply.

These pumps are available in complete skid mounted pumping units with gas, gasoline, or diesel engines or electric motors of various makes to suit the customer's preference. Horse power requirements will vary with pump speeds, plunger sizes, and working pressures. Consult our sales and engineering staff for recommendations and suggestions. Each unit will be properly engineered to suit your needs.

Construction Features of this pump emphasize simplicity and strength, a minimum number of parts, and easy maintenance.

The Power Frame is a high strength close grained grey iron casting, fully enclosed. All moving parts in the power end are self lubricated by splash system from oil in the crank case.

The Crank Shaft is a heavy alloy steel casting riding in large tapered roller bearings, 3" I. D. x 7½" O. D. x 2¼" wide, mounted in each side of the power frame. One end of the shaft extends to the outside of the power frame for mounting V-Belt sheave or coupling. This permits the driving power to be transmitted directly to the crank shaft. This shaft extension is 2 15/16" diameter and can be from either side of the pump.

Connecting Rods are steel castings with renewable babbitt lined steel shell bearings 3¾" I. D. x 3" wide in crank end, and bronze bushings 2" I. D. x 3" wide in the crosshead end.

Crossheads are cylindrical type semi-steel castings 7" O. D. x 7" long with outer surface ground and polished and lube-lok coated. The crosshead pins are hardened and ground steel pins, 2" diameter.

The Fluid End Body is a single piece casting. Molybdenum alloy iron is standard for crude oils, petroleum products, and fresh water. Aluminum bronze alloy is standard for salt water. Cast alloy steel bodies can also be furnished when special safety specifications demand it.

Cylinder Heads and Valve Chamber Covers are interchangeable. They are either alloy cast iron or aluminum bronze alloy, same as standard fluid end bodies. "O" Ring gaskets are used with these parts.

Standard Plungers for crude oil service are alloy steel, and for salt water service are bronze or stainless steel. Ceramic plungers and hard colmonoy surfaced steel plungers are also available on special order. Regular plunger sizes are 2½", 2¾", 3", 3¼", and 3½".

Fluid End Plunger Stuffing Boxes are sufficiently deep for receiving various types of standard packing rings for pumping ordinary self lubricating fluids. When necessary, the pump can be equipped with a force feed lubricator and special packing sets for plunger lubrication.

The Packing Glands are either alloy iron or aluminum bronze alloy castings. Three studs and nuts for each gland provide for even take-up.

Valve Assemblies for suction and discharge are interchangeable. Standard equipment consists of stem guided Durabla stainless steel valve discs and hard bronze seats or cast iron seats.

Dual 4" 150# ASA Suction Flanges and dual 2" 600# ASA Discharge Flanges provide for pipe connections to both sides of the fluid end.

Net Weight of pump is 2150 pounds.

GASO PUMP & BURNER MANUFACTURING CO.

Main Office and Plant: **902 EAST FIRST STREET, TULSA, OKLA.**

Export Office: **149 BROADWAY, NEW YORK, N. Y., U. S. A.**

EXCLUSIVE DISTRIBUTORS:

Shreveport, La.—W. L. Somner Co.
Odessa, Texas—W. L. Somner Co.
Brookhaven, Miss.—W. L. Somner Co.
Tinsley, Miss.—W. L. Somner Co.
Long Beach, Calif.—Power Pumps, Inc.
Houston, Texas—Peddlers, Inc.
Wichita Falls, Texas—Pump Engineering Co.
Evansville, Indiana—Hague Equipment Co., Inc.
Casper, Wyoming—Lufkin Foundry & Machine Co.
Edmonton, Alberta, Canada—Lufkin Machine Co. Ltd.

ledges, or high places where a snake may be resting. A strike or bite by a large poisonous snake on the head, shoulders or trunk is almost always fatal.

Do not jump across streams or ditches unless you have good visibility and can select a good-size clear spot of ground on which to land. An employe of a geophysical crew for an oil company made such a jump without looking—then midway in his jump he saw that he was going to land on a spot where several snakes were sunning and he instinctively tried to change his direction. As a result, he lost his balance, fell into the snakes, and was bitten several times. Fortunately, quick action on the part of his fellow crew members in getting him to a hospital saved his life.

Do not sit on stumps, fallen trees, or rock and stone walls without carefully looking over the spot as well as the vicinity immediately adjacent to it.

Wear gloves if it is necessary to pick up small flat objects such as boards or chunks of wood by hand. Stand in such a position that a poisonous snake under the object could not strike out at your feet and legs. Stand behind the object, facing the direction of the end which you are to lift. Lift the end of the board, or piece of wood, with the tips of the fingers without allowing them to reach under the object. A better hold may be obtained after you are certain there is no snake.

Do not attempt to pick up larger objects from the center, such as logs, long boards, lengths of pipe, or poles. Go to the end of the object where you can see both sides, use a stick to clear the debris from around it, and then lift it. In this way you will be able to see both sides and underneath clearly.

Never use your hands—particularly your bare hands—if a tool is provided for the job. When handling straw or grass cuttings, it is safer to use a pitch fork. Coral snakes are a burrowing type and are found under logs, rocks, decaying leaves, and grass piles. A yardman, putting grass cuttings into a wheel-barrow, found a coral snake firmly attached to his index finger after having dropped the cuttings into the wheelbarrow.

When working around rocks, rock outcroppings, or stones remember that poisonous snakes such as the timber rattler which inhabits such areas, may be hidden there. Use a stick or tool to separate or roll stones clear before picking them up, and wear gloves.

Never put your hands on rock ledges or rock walls, especially when climbing. Ledges and crevices are very likely places for rattlesnakes and copperheads to sun in spring and fall. Do not put your hands down unless you can see all around the spot and make sure there is not a snake in sight.

Never put your hands into a hole in the ground or a hollow log. These places are ideal shelters for snakes. If you must investigate, use a long stick and prod gently. You can soon tell whether or not there is anything alive inside.

Pipe line construction crews should be particularly alert when starting to work in the morning, especially around ditches and holes that may have been dug and left open for several days. Snakes may have fallen into these holes or ditches during their nocturnal ramblings in search of food.

Sleep in your car or truck if your work requires sleeping or camping out. Keep the doors closed and windows rolled up three-quarters of the way. Do not sleep on the ground in areas where there may be snakes if you can avoid it. If you must camp on the ground, set up a mosquito bar and tuck the netting well under the bedding; this will provide some protection from inquisitive snakes.

Do not make your camp where there are brush piles, rock piles or wood litter. Such sites may shelter snakes and their prey. Do not gather firewood after dark; even with a strong flashlight, you cannot see all around the places where you are putting your hands.

Linemen checking poles should be cautious before ascending. Walk around the pole first, and carefully look over the ground area. What is on the ground may be just as dangerous as a rotten pole. When descending a pole, before taking the last step onto the ground look the situation over again. It may have changed since you went up.

Never start horseplay with a dead snake or use one to scare a fellow worker. Do not cut the rattles off a freshly killed snake as a souvenir. If you feel you must, be sure that your heel is firmly pressed on the back of the neck between the head and the body.

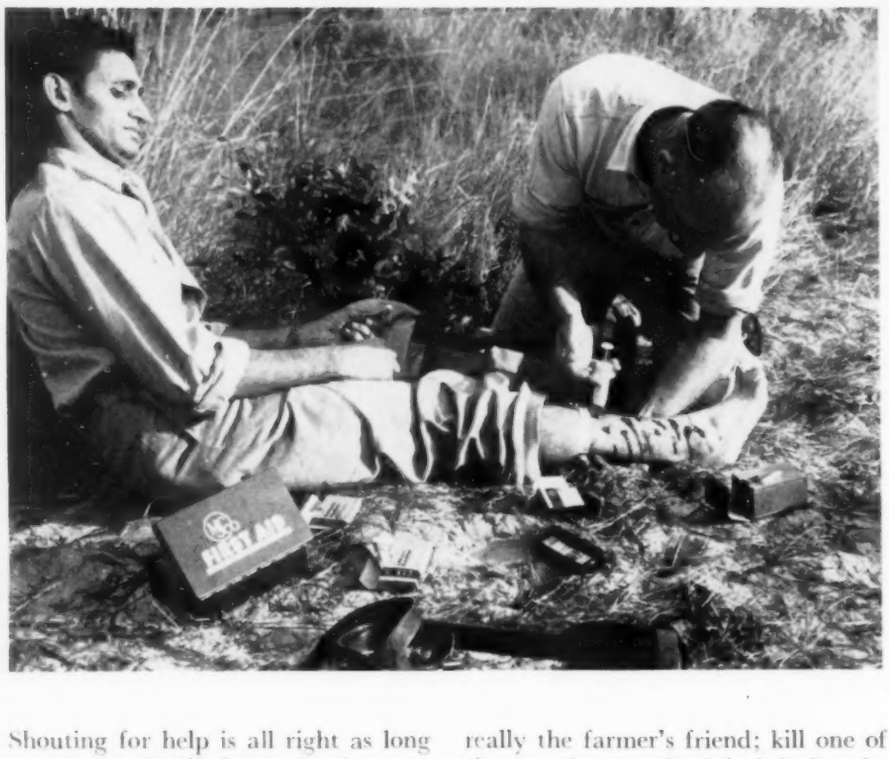
For safety's sake, however, it is best not to touch a freshly killed snake. Freshly killed and decapitated snakes behave in a manner indicating a belated reflex action. The head may be completely severed from the body and still be dangerous. If one should grab the neck an inch or so below the severed head, the head might turn and bite in exactly the same manner as if it were attached to the live snake, and just as effectively. As long as there is venom in the venom gland and the fangs are attached, this venom can be discharged.

Keep your eyes and ears open. The cottonmouth moccasin, copperhead and coral snakes have no rattles, so you must be alert and depend upon your eyesight. Small rattlesnakes shake their tails just like the big ones but make no more noise than the buzzing of a bee. Even large rattlesnakes cannot be depended upon to sound a warning, as their rattles might be under a coil or broken off in the course of their wanderings. On drizzly or rainy days water frequently fills the spaces between the rattles and the rattling sound cannot be made or the rattlesnake may not choose to sound his rattle.

Should you come upon a snake suddenly or hear a rattle, stop and remain immobile until you determine the kind of snake it is and where it is located. By remaining perfectly quiet until you can locate the snake or identify it, you may save yourself further trouble. Do not become panicky and try to jump or run. Running or jumping may lead you into more danger.

If the snake is stretched out in a crawling position or is in a pancake coil resting, you may safely step out of range before the snake can assume a striking coil. The striking coil is best described as an open loop on the ground, head and neck raised in "S" shape, poised to strike. The snake doesn't have to be in a striking position to bite, but unless coiled it cannot reach very far. Snakes strike mainly at moving objects. They can strike, recoil and be ready to strike again in one-half second.

Snakes do not travel in pairs as many believe; but in areas where there is one snake, there is reason to assume that others are nearby.



"V IS FOR VIPER with V-shaped head, and also his venom to knock you dead."

KNOW SNAKE-BITE FIRST AID. As many as 50 incisions may be necessary. Note position of constricting band ahead of incisions. Continuous suction must be maintained. Old incisions must be "reworked."

Shouting for help is all right as long as you stand still, for snakes have no ears. They cannot hear even the sound of their own rattle.

Rattlesnakes have excellent eyesight and are exceedingly sensitive to ground vibrations but if preoccupied they may not see you approach or may not pick up the vibrations of your steps. Taken by surprise, the snake has little choice but to stand its ground and fight in the only way it knows how to fight. Watch your distance, and if you are out of range for a strike and the surrounding area behind you is clear, step backward carefully. If you are not out of range, stand still. The snake may eventually move away or his attention may be directed elsewhere permitting you to move away.

If you are standing erect, the snake's attention will generally be focused on the feet or legs. Slow, smooth, even movements of the head or even the hands or arms are not easily detected and an individual can get out of the range of striking distance by moving very slowly and smoothly. A venomous snake will not give chase, although quick and agile in movement, it cannot travel fast enough to overtake a man. A poisonous snake can cover ground at a maximum speed of about three miles an hour.

Snakes are part of nature's economic program, therefore refrain from killing them just because they are snakes. Non-poisonous snakes are really the farmer's friend; kill one of these and more food is left for the poisonous one to thrive on.

Keep Emergency Equipment Handy—A snake-bite kit is a piece of essential, personal life-saving equipment. One should never be out of your personal possession when working in areas where there is a possibility of encountering venomous snakes.

Don't take it for granted the equipment works; take it out and test it at least every six months. Learn how to use it when it is issued. Assemble it, test it, and practice with it. See how quickly the tourniquet can be adjusted properly; prepare the lancet for use; fit the various adapters to the pump. If enough venom is injected at the time of the bite, death may occur from within a few minutes (which is rare) to a few days.

Don't depend on the other fellow. You may be alone when bitten, or the other fellow may not know how to use the equipment, or he may have lost or forgotten it. When snake bite occurs, the pain is too great and the fatality rate is too high to gamble.

Snake Bite Is Painful. The first aid and treatment of snake bite is extremely painful. There are many cases where death has occurred as a result of shock from the bite of a perfectly harmless snake. Do not become hysterical and start cutting yourself to bits unnecessarily. Familiarity with your equipment, and practice, will enable you to meet the emergency calmly and with preconceived, well-formulated plan of action.

Identify Snake If Possible. If struck or bitten by a snake, try to make positive identification. It may save a lot of discomfort in treatment. Do not waste time trying to kill the snake. If there is someone with you, let him do it. Such unnecessary muscle movement speeds up the circulation and spreads the venom more rapidly.

All poisonous snakes in North America other than the coral snake are classified as "pit vipers." All of them have a V-shaped head. Some species of snakes have V-shaped heads but are not poisonous. In addition to the V-shaped head, there is a shallow opening or pit on either side of the head between the eyes and nostrils, not easily seen at a distance.

- **Rattlesnakes:** May be distinguished by the rattles.
- **Copperhead:** A general pattern of copperish, chestnut, or reddish brown cross bands on a lighter ground color.
- **Cottonmouth moccasins:** Ground dark olive or dark brown colors. When annoyed, draws back head and opens mouth wide, exposing the cotton white mouth tissue from which its name is derived.
- **Coral Snakes:** The only poisonous snake in North America with a blunt nose is the coral snake. This is a brightly colored snake, with wide bands of black, red and yellow, that could be seen from quite a dis-

tance if it were not so secretive. The deadly one has a black nose or snout —easy to remember because we associate black with death. To distinguish it from other brightly colored snakes, this jingle may be helpful:

Red touch yellow, kill a fellow;
Red touch black, good for Jack

Bite Pattern Identifies Snake, Too. If there is still doubt as to the identification of the snake examine the bite carefully. There are any number of variations of the tooth pattern, depending upon the stage of development of the snake, the condition of its mouth, or the angle of the strike. There may be two fang marks on one side or two on both sides; two on one side and one on the other; or there may be only one fang mark on one side. There may be no teeth marks at all showing in the pattern. If there are only teeth marks with no puncture wound from the snake's fang, chances are that though the snake may have appeared to have a V-shaped head, it is probably of a non-poisonous variety.

A pit viper's fangs resemble a curved hypodermic needle with an orifice in front through which the venom is injected. Because the fangs are curved, the venom deposited at the time of the strike is slightly below the puncture wound made by the fang.

The coral snake bite is more literally a bite than a strike. This snake has very small fangs and leaves marks from both upper and lower jaws similar to the lower jaw marks of the pit viper except that no fang punctures will be visible.

Symptoms and Effect of Snake Bite. Don't take the bite pattern for granted, EITHER. Watch for symptoms. A pit viper bite will cause discoloration of the skin to a dark purple, pronounced swelling, pain almost immediately, increasing in intensity. If none of these symptoms develop within ten minutes, the snake was probably harmless. Should these symptoms develop, sit down and start first aid—alone, if necessary. Trying to get help may be a waste of precious time. Furthermore, unnecessary movement increases the rapidity with which the poison will spread through the system. Venom is harmless except as it gets into the blood stream via open wounds of the lymph system under the skin, into capillaries, and eventually into the blood stream leading to the heart.

The coral snake bite is accomplished by a more or less prolonged series of chewing motions which may scarcely be felt due to the very small teeth and the high neurotoxic quality of the venom. The high intensity of the poison accounts for the high mortality rate from the bite of the coral snake.

The symptoms themselves are very difficult to recognize and treat, especially if the victim is alone. There is very little swelling, but a burning pain where the bite occurs will be noticed. The victim eventually becomes drowsy and sleepy. The respiratory rate increases rapidly, then becomes slow and weaker. The neurotoxic poison attacks the nerve centers in the brain, affecting the thoracic muscles and the diaphragm. Due to the rapid paralysis, the victim is unable to breathe. For this reason, the victim of a coral snake bite should be kept in a sitting position.

First Aid Treatment. Each individual, after familiarizing himself thoroughly with the emergency equipment, should remember:

First aid should be administered at once. You may have only ten minutes in which to work. In cases of severe bite, the victim may not be able to help himself beyond this period of time.

The main objective of first aid is to remove as much venom as possible from the victim in the shortest possible time. The major steps are:

1. Constriction
2. Incision
3. Suction

Memorize these basic steps:

- The victim should lie down and remain quiet. If bite is from coral snake, keep in sitting position.
- Incisions should be made immediately, except when the bite is on the fingers or toes, then wait for swelling. As an emergency measure where a lancet or scalpel is not available, incisions can be made with a pocket knife, razor blade, broken glass, or even a tin can. Such substitute equipment is not recommended. However where a life is at stake from quick acting venom as against slower acting bacteria, such a choice might be necessary. The incisions should be about ¼-inch long and from ⅛ to ¼-inch deep, and should be made lengthwise and parallel to the long axis of the limb instead of crosswise.

If fang marks are near ankle or wrist bones, on the back of the hand, or on the foot, cut only through the skin where swelling occurs, and do it very carefully. Where there may be a danger of cutting blood vessels, nerves, or tendons, wait until swelling occurs. In the meantime work on those areas where this danger is not encountered.

- Suction should be applied at once and continued at the site of the bite for fifteen minutes.
- Constricting band (tourniquet) should be placed about two inches above the bite, between the bite and the heart.

Warning: Do not apply the constricting band too tightly. Be sure to test.

- The victim may drink as much water as he can hold, since he may have difficulty swallowing later. He should not be given alcoholic beverages.
- Paint areas bitten with antiseptic to reduce chances of infection.
- Keep the patient warm, head down, and treat for shock.
- Encourage the flow of blood to flush, assist in drainage, and maintain vitality of tissues.
- Keep the constriction band ahead of the swelling.
- Additional incisions should be made in the swollen area.
- Continuous suction must be maintained.
- Keep incisions open by use of wet compress dressings.
- Note when all the blood and venom has been sucked from the area of a single incision.
- Watch for excessive bleeding.
- Use as many pieces of suction equipment as may be available and substitute if necessary.
- Get the patient under the care of a physician or to a hospital as quickly as possible.

The above is only an outline of steps to perform in treating the bite from a venomous snake. Detailed instructions and literature such as the National Safety Council's Snake Bite Manual should be available to all personnel subject to possible contact with venomous snakes.

ACKNOWLEDGMENT

PIPE LINE INDUSTRY wishes to thank the National Safety Council, 425 North Michigan Avenue, Chicago 11, Ill., for permission to publish this article. The article is digested from their Snake Bite Manual.

Aramco

Side-boom tractors sling-carry a 400-foot length of the Safaniya-Ras Tanura pipe line to the spot where this section will be installed on steel piling supports. Through 28 miles of low-lying sabkhah areas which become soft when the tide rises, the pipe line is supported above ground for stability and to avoid corrosion from the salty water. It is mounted in steel rings welded atop steel pilings.

Twenty-eight miles of the 142-mile, 22-inch line along the Arabian coast is supported above corrosive salt flats.

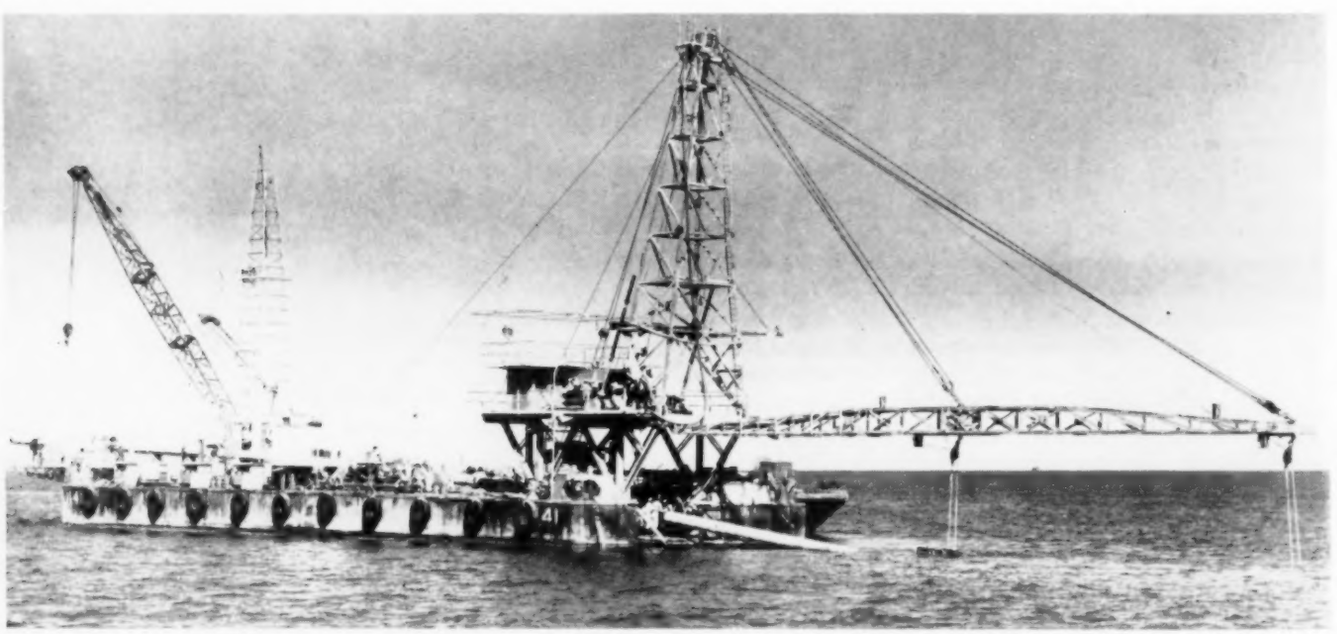
By H. T. BRUNDAGE
PIPE LINE INDUSTRY Staff

ARABIAN AMERICAN OIL COMPANY is rushing to completion its 22-inch crude oil pipe line from the Safaniya oil field to the Ras Tanura refinery and terminal. Construction on the $21 million project began in January 1956, and is scheduled to be completed by May.

Initial capacity of the new line will be 50,000 barrels daily; plans call for expansion to 125,000 barrels by midsummer and gas turbine pumping additions will permit a maximum rate of flow of 190,000 barrels daily by the middle of 1958. International Bechtel, Inc., is contractor on the project.

Rock country, sandy soil, and supply difficulties were a few of the problems encountered. The greatest handicap overcome by contractors on the project was construction through the Arabian salt flats known as Sabkhahs. When tides rise abnormally these areas become soft and hold water for long periods, creating construction and corrosion hazards. Aramco overcame this obstacle by elevating 28 miles of pipe line across the sabkhahs.

Safaniya is the world's biggest proven marine offshore oil field. The field was discovered in 1951 and is the first offshore production in the



Aramco's pipe-laying barge lowers 16-inch Safaniya field trunk line in the Persian Gulf. This barge, 142 feet long and 40 feet wide, was built in Europe according to Aramco specifications for the special conditions encountered in the Persian Gulf. Forward outrigger and 90-foot boom astern provide additional control of pipe string.

Whips 'Sabkhahs' on Ras Tanura Line

Persian Gulf. To date, two wells have been completed onshore and 20 drilled offshore in waters up to 45 feet deep. There is also one observation well.

Line Built to Move Viscous Crudes. Safaniya production is a sweet paraffinic crude with a gravity of 27. There were three possibilities of moving production—by tanker, by Trans-Arabian Pipeline (Tapline) or by the new line to a refining and tanker loading terminal at Ras Tanura. Of these, the new line from Safaniya to Ras Tanura was selected as the most feasible. For tanker shipment, construction of offshore loading facilities in the Safaniya area would have been necessary.

The Safaniya field is only about 40 miles from the Trans-Arabian pipe line system and it would have been possible to connect with a spur. However, crude produced here is more viscous than other Saudi Arabian crudes carried. Aramco estimated that if Safaniya (Bahrain zone) crude were intermixed with those crudes, throughput of the line to Sidon, Lebanon, would have reduced by several thousand barrels daily; the over-all effect would have been a reduced efficiency of the 300,000 barrel per day line.

Shorter Coastal Route Selected. Once it was decided to build the line there were two possible routes—either along the coast or parallel to the existing line farther inland. The coastal route has less rock and topographic relief; it is also less apt to be buried in 30 to 50 feet of wind-driven sand which would hamper maintenance and repairs.

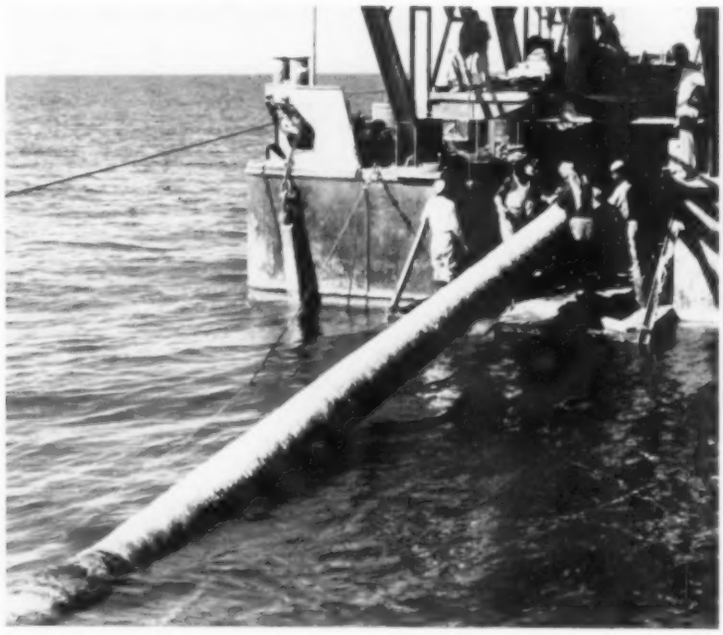
In spite of its advantages the coastal route presented one peculiar problem—the sabkhah. Following very high tides or rare rainstorms, these inland "troughs" can stay filled with water for considerable periods of time. They present a tough construction obstacle if they become filled during or just before pipe laying begins.

All but 28 miles of the 142-mile Safaniya—Ras Tanura line is buried, but in the sabkhahs, steel supports were driven into the ground by a pile driver. Supports were then capped and fitted with ring girders to hold the pipe in place about two feet above ground. This eliminated the severe corrosion problems that would have been created had pipe been buried.

Despite these sabkhah problems, advantages of the route far outweighed the liabilities. It is 55 miles shorter than the inland route and presented much less rock blasting work.

Corrosion Protection Complete. Offshore wells and facilities at Safaniya will be protected cathodically. Persian Gulf waters ranging in temperature up to 90° F. are highly corrosive. In addition to pipe coating and cathodic protection, pipe line platforms and main gathering risers are to be monel-clad through the splash zone; flow line risers at the well are not clad. Coating and wrapping specifications from both submarine and shore lines include asphalt primer, and a double coat and

A crane at bow of Aramco's pipe-laying barge lifts a joint of 16-inch pipe into place on the 40-foot forward outrigger.



Well deck at stern provides location for final protection of field joints. Line is supported by stern boom as it enters water.

Ditching problems were varied and tough. Most of the 142-mile line was buried in the Arabian desert country. Here a ditching machine cuts through the soft ground. Sandy soil made it virtually impossible to hold bank.

As coating and wrapping machine moves along 22-inch Safaniya-Ras Tanura line, soft sand banks and spoil has almost filled the ditch at its normal angle of repose.

wrap of asphalt enamel and glass fiber. In addition, concrete coating of an inch to an inch and a half is applied to submarine lines. All pipe lines in the system will be cathodically protected by impressed currents.

The main gathering line is 16-inch. About 40 miles of 6-inch submarine flow lines are included in the system.

Rock country was encountered in addition to desert sand and wet salt flats. Here Saudi construction workmen use a twin drill to make five feet deep blasting holes along right-of-way.

A gas-oil separator plant is being completed immediately onshore near Safaniya at the apex of the flow-line system. Gas-oil ratio of wells is about 90 cubic feet per barrel as compared with from 600 to 900 cubic feet per barrel ratio of most Saudi Arabian wells farther South.

Pumps Gas Turbine Powered. Although it is possible that diesel pumping units may be used temporarily at the start-up of the Safaniya line, design calls for use of small gas turbines. Aramco suffered the misfortune of seeing the ship Lemsterkerk, bound for Ras Tanura with three 900 horsepower gas turbine units and 15,000 feet of 22-inch pipe, trapped in the Suez Canal during recent hostilities. It was freed to return to the Mediterranean in early January and was expected to arrive at a Persian Gulf port in March.

Despite this delay, Aramco officials hope for completion of the new line in May. These three turbines were to be installed at Safaniya to serve as the primary pump station. They will burn natural gas produced with the crude.

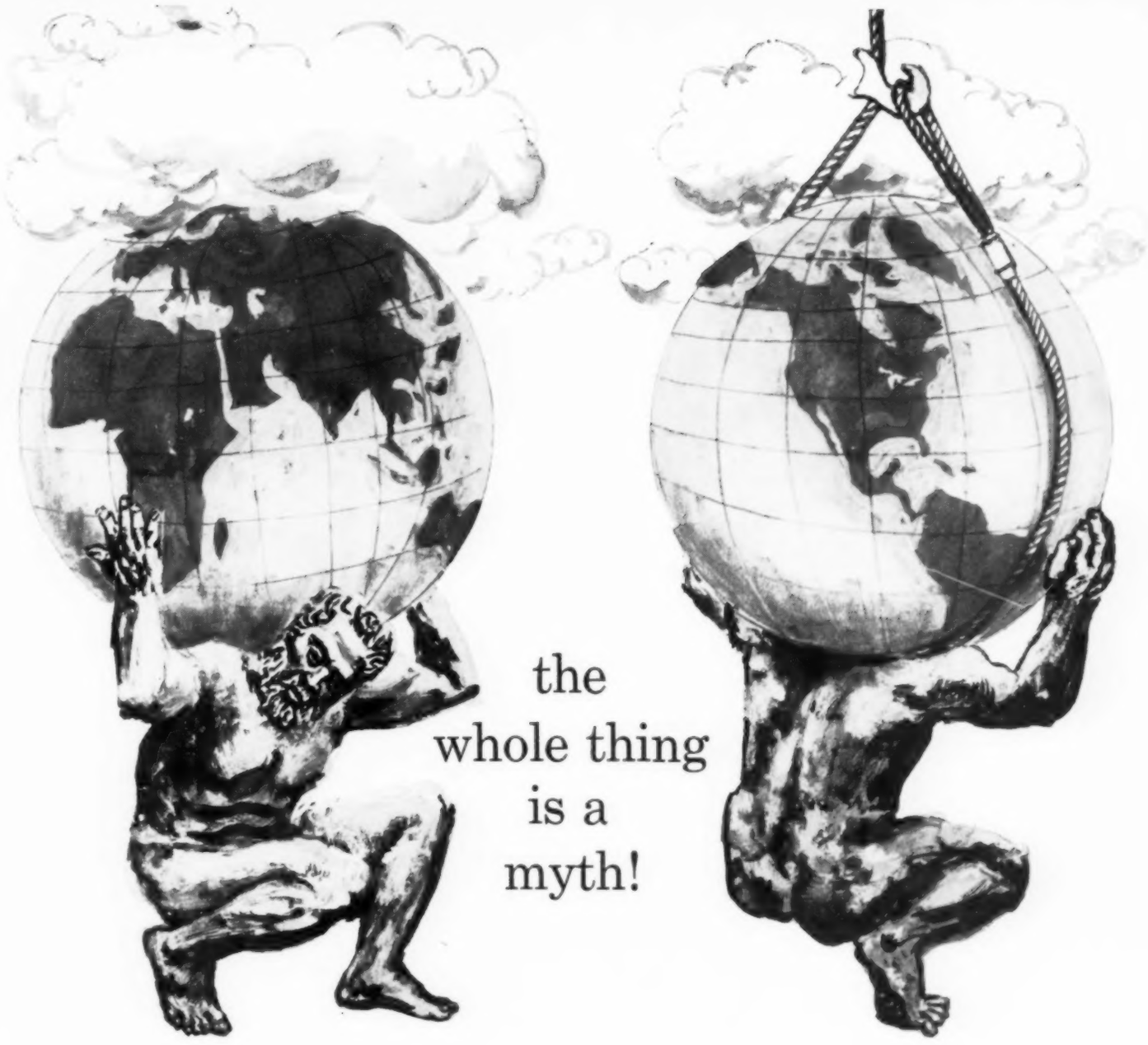
Future plans call for a second pumping unit approximately at the midpoint of the line, not far from the newly discovered Khursaniyah field. Definite proposals have not been outlined but they will probably involve either another battery of 900 horsepower units or one large turbine rated at 5000 hp. This second pump station would burn crude oil rather than natural gas. Possible corrosion problems arising from residual ash, particularly vanadium, at turbine temperatures of 1200° F., are not expected to be serious with proper inhibitor treatment.

Aramco has experience with crude-burning combustion turbines that have been used to generate electricity in Saudi Arabia, and Tapline is now installing 5000 hp crude burning turbine pumping units at five stations in an expansion project. Chemical inhibitors in the crude oil fuel is the apparent answer to the turbine corrosion problem.

Pipe used for the Safaniya-Ras Tanura line is 22-inch OD, seamless with ¼-inch wall over the entire line with the exception of the last five miles at the refinery end. For added safety, the pipe used over the short terminal stretch has a 5/16-inch wall thickness. Pipe for this project was purchased in Western Europe; about 21,000 tons of pipe is going into the project.

Double Jointing Yards Speeded Progress. In order to cut down the amount of welding necessary along the route, a "double-jointing" yard was set up at Ras Tanura. There, two joints were welded into 80-foot lengths before being trucked to the right-of-way. All welds, including those made in the field, were X-rayed to check for flaws.

At the refinery and terminal, four new 180,000 barrel tanks and the necessary piping are being constructed to permit the handling of Safaniya crude. Terminal loading lines also had to be expanded to permit the handling of Aramco's increased productive capacity. —**The End**



the whole thing is a myth!

...the work is done by a Roebling Sling!

It's a fact that holds true for lifting jobs in almost every industry you can name. The types of slings and fittings that are manufactured by Roebling would fill a book (and they *do*—a 51-page catalog that's yours for the asking).

The endless and often monumental materials handling needs of industry are met, in every respect, by the complete and completely dependable Roebling Sling line. They include: All-Purpose Slings, Grommet, Roegal® Cable-Laid, Flatweave and Railroad Slings; Flatweave Drawbar and Plate-Lifting Slings and a full line of end fittings. Within each of these categories are a variety of sizes, strengths and capacities.

Certain facts apply to all Roebling slings, whatever their use: advanced construction features certify safe, steady service and stability under load.

The new catalog that we'd like to send you is designed to make sling selection and ordering as easy as the job a Roebling Sling performs. Ask for A-931. Meanwhile, if you have any materials handling questions or want further sling information, your Roebling salesman or distributor will hasten to help you out. Write to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities

Subsidiary of The Colorado Fuel and Iron Corporation

For more data on advertised products, use Readers' Service Cards, last page.

20 Guides to Efficient Buying

Make salesmen part of your team; ask them for their ideas.

Keep in touch with the situation by keeping in touch with your receptionist.

These suggestions are designed to help salesmen and purchasing agents increase efficiency and save valuable time. How many of these ideas are you now using?

Just one useful timesaver properly applied to a busy buying day may make your job easier to accomplish, your value to your company immediately more evident.

Twenty ways have been suggested by purchasing agents for purchasing agents. They are fundamental.

But with the thought that basic information is often easiest to forget, these reminders are offered as a practical solution.

1. Cut Down on Small Orders: Small orders are a source of headaches for buyers and sellers alike. The cost of handling a small order is sometimes more than the purchase price of the item itself.

Cut down small orders through planning and education. This can save time all around.

In many cases, the small order can't be avoided. In others, the salesman may get a big order as a result of many little ones being bunched together.

Better planning and "education" within a company can ease the situation. Blanket and group contracts are often usual. Petty cash for purchases within certain dollar limits can save entry time. Using the mail for small orders helps.

2. Arrange Meetings of Buyers "Using" Departments: By having members of the purchasing staff meet with their counterparts on the "using" side, each will gain an appreciation of the other fellow's problems. A feeling of teamwork will develop. Teamwork means less waste of time and effort. The salesman can often be brought in on the team.

3. Prepare a Buyer's Guide: Help the salesman find his prospect with a minimum of shunting around. A simple buyers' guide listing the categories individual buyers handle will save everybody time. The guide need not be an elaborate affair. Since it is expendable, it can be

PRECISION WORKMANSHIP
DESIGN LEADERSHIP
DEPENDABLE PERFORMANCE

YOU GET ALL THESE DESIRABLE FEATURES IN—

R&S
INDUSTRIAL CONTROLS
for Hazardous Locations

Complete product lines for surface or panel mounting

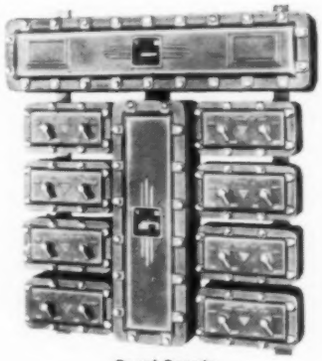
Many electrical equipment items today look quite similar, have standardized ratings and specifications . . . but there is one important difference — *QUALITY.*

By QUALITY we mean design leadership, dependable performance, and precision workmanship — three important features that make R & S electrical equipment for hazardous locations the standard of comparison.

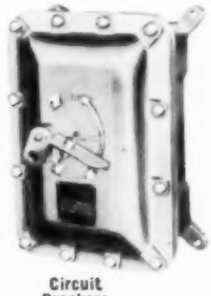
R & S electrical equipment is specified and preferred by architects, contractors, designers, engineers and maintenance men in all types of industries. Feature for feature, item for item, there is nothing finer for hazardous locations than the R & S complete line.

If you are concerned with the proper application of electrical equipment to eliminate dangers in your hazardous locations, let R & S help you solve any problem.

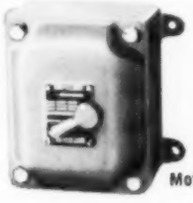
EFS Pilot Lights



Panel Boards Standard and Custom Built

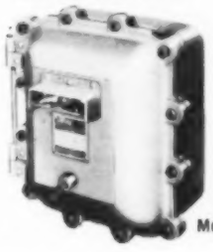


Circuit Breakers



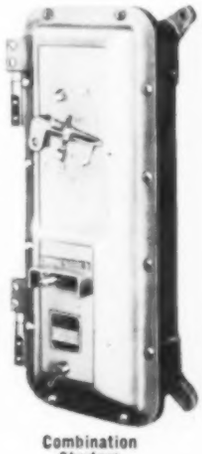
Manual Motor Starters

EFS Push Buttons and Selector Switches



Magnetic Motor Starters

EFS Switches



Combination Starters

R & S Explosion-Proof, Vaportight, Waterproof and Weathertight STANDARD STOCK LINES

EXPLOSION-PROOF EQUIPMENT

- Explosion-Proof Lighting Fixtures
- Circuit Breakers
- Combination Starters
- Tumbler Switches
- Motor Starters
- Push Button and Pilot Light Stations
- Delayed Action Plugs and Receptacles
- Unialarm
- Monolarm
- Standard and Custom-Built Panelboards
- Disconnect Switches
- Sealing and Flexible Fittings
- Interlocked Switches and Combinations

ELECTRICAL SPECIALTIES

- SAF-T-ARC Plugs and Receptacles
- Floor Boxes
- Ever-Lok Plugs and Receptacles
- Vaportight Lighting Fixtures
- Dust-Tight Lighting Fixtures
- Angle Type Plugs and Receptacles
- FS and FD Boxes, Receptacles and Switches
- Marine Switches, Receptacles and Fixtures
- Underwater Lighting
- Junction Boxes

Write for Catalog 56— D-24

RUSSELL & STOLL COMPANY, INC. • 125 BARCLAY STREET, NEW YORK 7, N.Y.

RUSSELL & STOLL

PRECISION-BUILT ELECTRICAL EQUIPMENT — SINCE 1902

If the buyer knows in advance he won't be there, he should cancel appointments with salesmen or provide for a stand-in.

run off on one sheet (8½ x 11) both sides. Mimeo or offset could do it.

4. Tell Salesman How Much Time He Has: Time can be saved by telling the salesman specifically that he can have 10 or 15 minutes for the interview. He will eliminate frills and pace himself within the time limit set—or else!

If the salesman is given the idea that he has all day, he may take it!

By setting time limits for sales interviews, the buyer can see more salesmen. More salesmen mean more contacts—and an opportunity to do a better buying (and listening) job.

The salesmen waiting outside will be quick to note "Entrances and exits" and will begin to prepare themselves accordingly for their own interviews.

5. Prepare and Use a Purchasing Manual: The great majority of companies which have purchasing manuals report that they "do a job." A manual must naturally be tailored to a company's needs—be it complete in every detail or a bare outline of basic principles and policies.

A purchasing manual can be a time saver in several ways. First, it sets down in black and white, functions and duties in the organizational set-up. The exact responsibilities of the buying department are spelled out.

The manual will provide a time-saving basis for arriving at a decision on matters of an "out of routine" nature. In addition, it permits buyers more time for doing their basic job-buying by eliminating routine supervision.

The manual can also be a good will builder for the buying department among other divisions of the business. Lastly, it is a time saver orienting new members of the buying staff.

Speed up interviews to get the meat of the matter quickly—order or no order.

6. Have Enough Buyers with Specific Purchase Areas: Time and money can be saved by building an adequate buying staff. With a fully manned force of buyers, each member can concentrate on his respective area—follow trends and latest developments.

An undermanned staff is likely to be harried by trying to keep too many balls in the air. They are forced to become "jacks of all trades—masters of none."

Enough buyers mean more coverage. Each man can see more salesmen and do a better job.

7. Keep a Memo on "Must," "Could" and "Opportunity" Buying: By keeping an account of what must be bought, what could be bought and keeping a weather eye open for opportunities, problems are put into three neat, time-saving packages.

With such information at hand, a buyer can see salesmen quickly and buy efficiently and selectively. As the day progresses, items can be checked off with clocklike regularity. What is left over can be transferred to the next day's buying sheet and the procedure repeated.

If there is no apparent need for a certain product, the salesman can be quickly steered for another one more necessary. Useless presentation time is saved.

8. Handle Routine Re-orders by Mail, Phone or Wire: When a routine reorder comes up, the most time-saving way to handle it is by letter, telephone call or telegram. There is no need to save it until the salesman calls again. When the salesman does call there is more time to discuss new items, new ways to use old ones.

9. Establish Regular Buying Hours: Buyers, and their titles do not imply it, do more than just buy. As with every job, a certain amount of "paper work" and administration comes into the picture.

By establishing regular hours, the buyer can prepare for his job.

The salesman, for his part, saves time, too. He knows in advance when the "welcome mat" will—and won't—be out.

10. Arrange Interviews by Appointment: Orderly buying can be speeded up by arranging appointments in advance and seeing salesmen only by appointment, or during specified hours.

The buyer thus knows who is coming and therefore has time to prepare before the interview. For his part, the salesman arrives on schedule and sees the buyer with a minimum of delay.

11. Ask Salesmen for Their Ideas: Listening to salesmen can be time well spent. Salesmen move about constantly . . . are a fertile source of profitable suggestions. In industry they are looked upon as outstanding sources of ideas on substitution, standardization, specification revision and many other subjects.

Having the salesmen "open up" can bring in ideas as well as take out a favorable public relations story about a company. Time spent in listening to salesmen is an investment which can bring a rich return.

12. Keep in Touch With Your Receptionist: A re-

ceptionist is in a spot to supply the buyer with "Forward Intelligence." She can tell who is next, what company he represents and what, in general, he offers.

Also, she can tell how many are waiting, and who they are.

With this information, interviews can be speeded up —or slowed down. If a salesman has some interesting bit of information, he can be drawn out in detail if a buyer knows the reception room is practically empty. On the other hand, a salesman can be told, if the outer room is bulging, that he can have only a few minutes—with a suggestion he return later. He will adapt himself—omit small talk. Also, he will respect a firm for respecting other's time.

13. Help Eliminate Useless Calls by Salesmen: Repeated call-backs by a salesman are time consuming—frustrating if no order results. If, after several efforts to see a busy buyer, the salesman is granted a "courtesy interview" (but no order)—time is lost.

When the buyer learns that a certain salesman is waiting and the buyer knows he has nothing for him, the salesman should be so informed. The salesman can then determine if he wants to spend his time elsewhere —and save the buyer's time too.

Minimize rush requisitions. Control the source of rush requisitions and the problem is half-solved.

14. Minimize Rush Requisitions: Rush requisitions are, of course, necessary in any business, but they can be cut down by more efficient production planning. They can also be reduced by a tight control of stock on hand, the establishing of maximum and minimum limits for the inventory.

Another method of curbing rush requisitions is educating the "using" department head on what is definitely needed immediately, what can wait for normal service.

An unusually large number of rush requisitions is a definite handicap to efficient buying.

15. See Salesmen in Order of Arrival: When a salesman makes a special effort to be ahead of the rush to see a buyer, common courtesy dictates that he be seen before the later arrivals.

One method of keeping everyone in order is to provide a "Sign In" register or cards for the salesmen. They can indicate on the cards their time of arrival, name, product and company.

On arrival, the salesman should be required to give his name, his firm and the nature of his call. The buyer will be better prepared if he has such facts when the salesman enters. It is a time saving report, too, if a call-back is necessary—eliminates needless questions.

16. Cut Down Telephone Interruptions: Problems are best handled when taken one at a time. A salesman is in the middle of a technical explanation—and the phone rings! Immediately the train is derailed. It has to be put back on the track and started again. Valuable time is lost!

Many buyers insist that secretaries screen all incoming telephone calls. Only the most important ones get through. Then, when the phone rings, the interruption can usually be justified.

A time-saving practice is to have the secretary take the names of the persons calling and turn them over to the buyer. These calls can then be answered between seeing salesmen. Such practice allows important calls to get the immediate attention they deserve.

17. Suggest That Salesmen Furnish One Sheet Highlights: Suggesting that salesmen furnish a single sheet which gives the salient features of their interview saves time.

Having the salesman furnish a single sheet which gives all the important facts about his proposition saves time too!

18. Let Salesmen Know Which Buyers Are Available: It is not uncommon for a salesman to wait to see a buyer—only to discover that he is out for the day—or otherwise not available.

A good idea is to have the buyers' names posted on "In" and "Out" boards. If alternates are substituting, this should also be indicated. The salesman can then tell at a glance whether the man he wants to see is on the premises. If he is not, he can leave his card or literature with a note arranging for a "call back." The receptionist should see to it that the buyer sees this material.

19. Speed Up Interviews: Build a reputation "for getting 'em in and getting 'em out." Word soon gets around that you buy with an eye on the stop-watch, as well as on quality, service and prices. Salesmen arrange themselves to fit this pattern (it helps everyone!)

By speeding up interviews, one can see more salesmen, gather more information and do a more thorough job.

Cutting down on side excursions, keeping the salesman on the track, getting his story quickly and deciding quickly stimulates better and faster business.

20. Coordinate Buying Activities: Much time can be saved by coordinating buying and procedure activities. Reports, memos, meetings and informal contacts are some of the ways of doing it.

If the buying operation is a big one, it might be well to have liaison representatives in some of the more important departments. Reports on market conditions through regular bulletins to members of the organization who "use" material is another device to coordinate buying. Forecasts by competent people may make a desirable plus feature for such bulletins.

In smaller concerns, coordination may be less of a problem if top executives are in daily contact with each other. Even here, the problems of purchasing and procurement should be integrated with other company functions.

ACKNOWLEDGMENT

Published through courtesy of National Sales Executives, Inc., New York, N. Y., as a service to purchasing agents and salesmen.

Marine Gathering Commissions New Offshore Pipelaying Barge

The "Magic," first ocean-going barge built specifically for offshore pipelaying operations, was commissioned March 20 at a Greens Bayou shipyard near Houston by Marine Gathering Company.

Designed to operate in unpredictable waters of the Gulf of Mexico, the modern three-quarter million dollar barge is capable of laying 2000 feet of large diameter pipe or 5000 feet of small diameter pipe in a single day, even in bad weather.

Pipe is "boomed" to the ramp and laid in 40-foot sections. Welding and coating operation on field joints take place on the ramp before pipe is lowered into the water. The completed portion of pipe is lowered to the ditch, already dredged along the ocean floor, as the barge moves out from under it.

Except when being towed to a project, the barge propels itself. As each section of pipe line is lowered, the "Magic" moves by pulling in on two forward anchors and letting out on two aft anchors. A tug then repositions the anchors.

Equipped to function throughout a 24-hour day, the barge will house a 46-man crew. The craft consists of a superstructure containing air-conditioned crew quarters and offices topped by the captain's bridge at the bow; and a ramp leading from the superstructure to the barge deck level at the stern. Flanking the ramp are two 35-ton cranes with a stiff leg crane at the stern.

During pipelaying operations, work will proceed simultaneously at five working stations on the ramp. The stringer bead is applied 40 feet from the ramp's top and the hot pass is run at this station; filler and cap welds are applied at the next two stations; the field-joint is X-rayed at station four; and wrapped with corrosion and water-resistant polyvinyl tape and coated with concrete at the final station.

The "Magic" will be part of a "seagoing fleet" including a crew boat for transporting personnel to and from the barge, an electronically directed buoy boat for dropping markers, a tug to bring loaded pipe barges and remove empty ones, the pipe barges, and a second tug used to reposition the anchors as the barge moves.

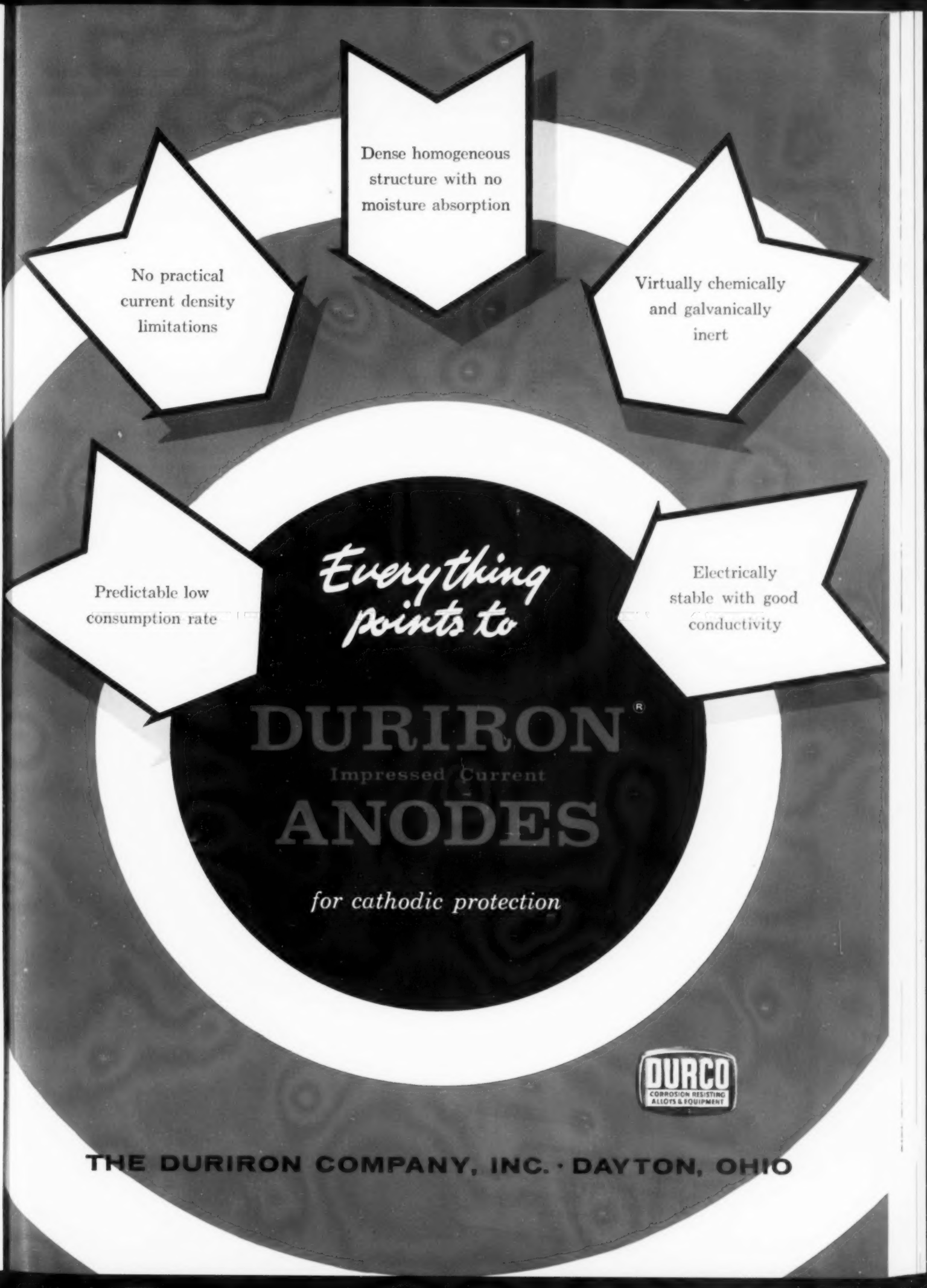
Marine Gathering Company officials are C. Burton Liese, president; Robert C. Ledford, vice president; L. E. Davis, superintendent of construction and operations; and M. I. McGowan, chief engineer. Albert Cohen, pipe superintendent, will supervise pipelaying. Captain W. C. Hanson, a first mate and five seamen will operate the barge. Marine Gathering is a wholly-owned subsidiary of Commonwealth Oil Company.

Work Underway on Crude Line in Four Corners Area

Survey work began two weeks ago on the new 600-mile Four Corners Pipe Line from the Four Corners area to Los Angeles. The first survey crew started operation near Kayenta, Ariz.

San Juan Engineering Company of Farmington, N. M., will survey the northeastern portion of the route, E. H. Schmidt and Associates, Incorporated, of Tulsa will handle the center section, and McIntire and Quiros, Incorporated of Los Angeles will survey the California portion.

Aerial and ground reconnaissance has been underway by engineers of Shell Pipe Line Corporation, who will operate the line as agents for Four Corners Pipe Line Company. (See PIPE LINE INDUSTRY, March 1957, Page 66). Locations of the three initial pump stations on the 16-inch trunk line have not been determined, but they will be in the gen-


Dense homogeneous structure with no moisture absorption
No practical current density limitations
Virtually chemically and galvanically inert
Predictable low consumption rate
Electrically stable with good conductivity
Everything points to
DURIRON®
Impressed Current
ANODES
for cathodic protection
DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT
THE DURIRON COMPANY, INC. · DAYTON, OHIO

eral vicinity of Bluff, Utah; Cameron, Ariz.; and Twentynine Palms, Calif.

The proposed line will have a capacity of 60,000 barrels daily. The system consists of 750 miles, including 8- and 12-inch feeder lines to the Aneth and other fields in Utah and the Bisti field in New Mexico.

New Gas Pipe Line Map Available from FPC

A revision of the map of the major natural gas pipe lines in the U. S. has been published by the Federal Power Commission. The Dec. 31, 1956, revision of the map is 13 by 18 inches with a scale of 170 miles per inch.

Printed in five colors, the map shows major existing lines, those under construction, lines authorized but not yet started, and proposed lines pending Commission action. Gas lines proposed to be abandoned also are shown.

Copies may be purchased from the Federal Power Commission, Washington 25, D. C. at 25 cents each. Order number is FPC M-48.

Texas Eastern Proposes $30 Million Expansion

An additional 67,610 horsepower of compression facilities and 137 miles of pipe line are proposed by Texas Eastern Transmission Corporation and its subsidiary, Texas Eastern Penn-Jersey Transmission Corporation, in a recent application to the Federal Power Commission.

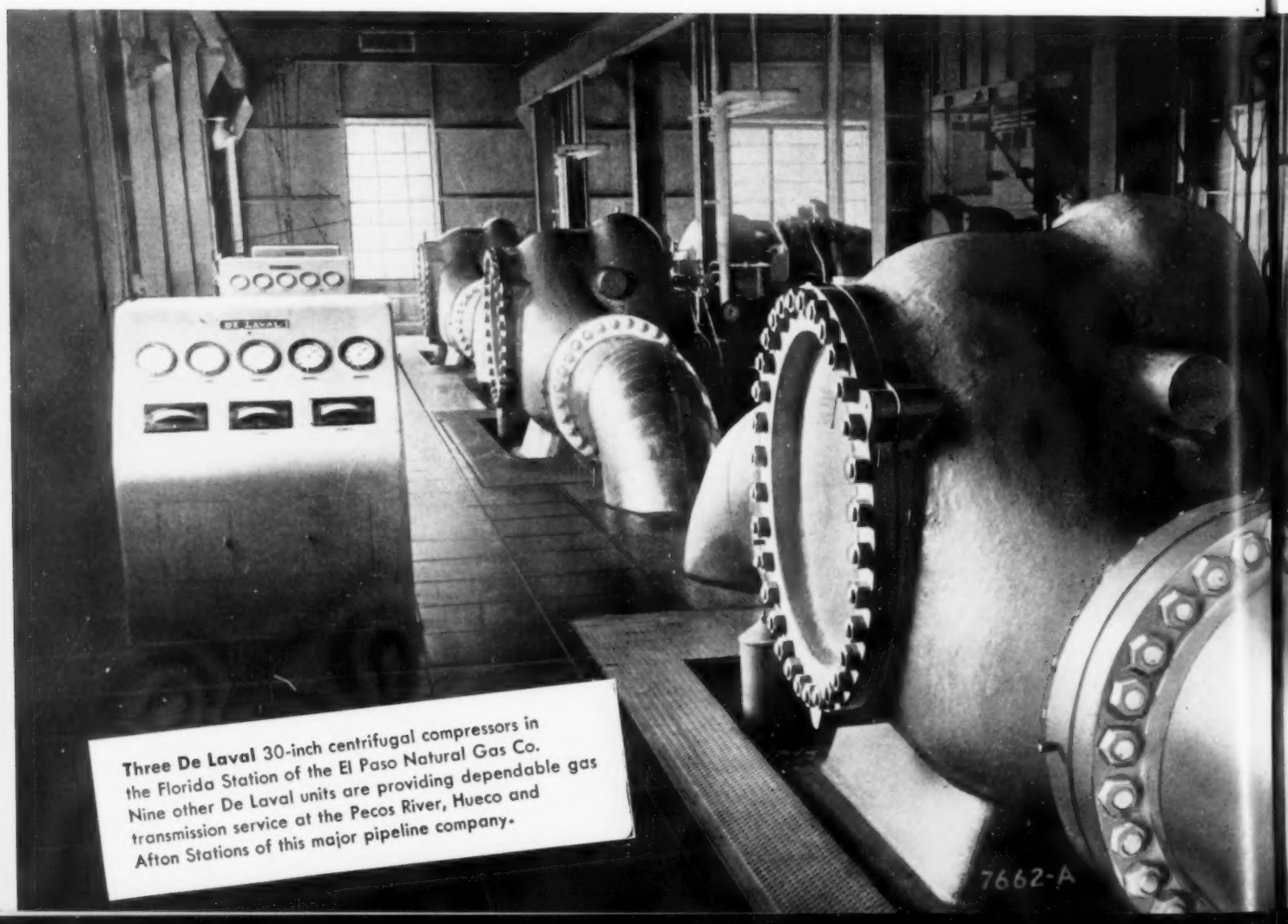
The projects will add 110 million cubic feet to the daily capacity of Texas Eastern's natural gas transmission system. Texas Eastern's facilities will cost $25.9 million and Penn-Jersey facilities are estimated to cost $4.4 million.

The compressor facilities would include a new 10,250 horsepower compressor station near Mont Belvue, Texas, on the company's recently authorized 30-inch pipe line from the Vidor compressor station near Beaumont, to a point on the Rio Grande near McAllen, Texas. Horsepower would be added on the company's existing 30-inch line between Beaumont and Kosciusko, Miss., at Gillis station, Beauregard Parish, La.; St. Francisville station, West Feliciana Parish, La.; Union Church station, Jefferson County, Miss.; Clinton station, Hinds County, Miss.; and at Kosciusko station, Attala County, Miss.

Texas Eastern also requested addition of 2200 horsepower to a previously authorized station near Linden, N. J., and construction of metering and regulating stations necessary to make sales of the larger amount of natural gas to be moved through the line.

The company requested authorization earlier for construction of 97 miles of additional 30-inch pipe line loops along the existing 30-inch line between Kosciusko, Miss., and Uniontown, Penn., and approximately 40 miles of new lateral supply lines.

The Penn-Jersey system proposes to construct and lease to Texas Eastern additions to five existing or authorized compressor stations along its system in Pennsylvania. Construction on projects for both systems will begin as soon as authorization is received. Completion is expected in time to begin operations of the new facilities by September, 1957.



Three De Laval 30-inch centrifugal compressors in the Florida Station of the El Paso Natural Gas Co. Nine other De Laval units are providing dependable gas transmission service at the Pecos River, Hueco and Afton Stations of this major pipeline company.

'Little Inch' Conversion Decision Speeded Up

Action on the conversion of Texas Eastern Transmission Corporation's "Little Inch" line from natural gas service to petroleum products has been speeded up by a Federal Power Commission order to omit the usual intermediate examiner's decision.

The Commission will decide the case without the decision of the presiding examiner, which would further delay the case now pending for more than 2 years.

Texas Eastern proposes to reconvert a 1168-mile section of the "Little Big Inch" from Baytown, Texas, to Moundsville, West Virginia, to petroleum products service. The line will have an initial capacity of approximately 185,000 barrels of petroleum products daily.

Last year the FPC gave approval for the conversion but the decision was remanded by the U. S. Court of Appeals of the District of Columbia. Since last October the FPC has been studying the possible effect of the conversion on barge lines and other petroleum products carriers, possible monopoly aspects and effect on national defense.

If the conversion is approved, Texas Eastern proposes to transport aviation and motor gasoline, jet, tractor and diesel fuel, kerosine and liquified petroleum gases from Texas, Louisiana and Arkansas to 11 southern and midwestern states.

Semi-Automatic Double Jointing Cuts Cost

A new process of semi-automatic double jointing is being used by Price-Poole on Trans-Canada's line from Alberta to eastern Canada. Allowing welding to be carried on in temperatures down to 40° below zero, the specially designed gantry boom shown above carries an automatic welding head and an operator inside the pipe. Both inside and outside welding heads remain stationary as the pipe is revolved.

DE LAVAL

CENTRIFUGAL COMPRESSORS

on the job at El Paso Natural Gas

De Laval centrifugal compressors offer many important engineering features. (1) They are designed to handle an increased ultimate flow, can be quickly converted to larger capacities by replacing the impeller, diaphragm and a few minor parts. (2) The high pressure shaft seal eliminates leakage, consumption of sealing oil is negligible. (3) There is only one moving part—the rotor—which has ample clearance. (4) Units are compact, require smaller foundations and smaller stations. (5) First costs and installation costs are low.

Bulletin 503 gives data on De Laval Centrifugal Compressors. Write for your copy.

DE LAVAL *Centrifugal Compressors*

DE LAVAL STEAM TURBINE COMPANY

884 Nottingham Way, Trenton 2, New Jersey

DL375

fish

ENGINEERING CORPORATION

HOUSTON, TEXAS

LET FISH GO WITH YOU EVERY STEP OF THE WAY

The Fish Companies have played a vital role in some of the most important projects of the postwar era. Forethought and vision are apparent in every project. Fish economists, engineers and construction men lead the way—every step of the way.

Affiliated Companies

FISH SERVICE CORPORATION

FISH NORTHWEST CONSTRUCTORS, INC.

Great Lakes Pipe Line Plans 140-Mile Extension

A 140-mile 8-inch extension from the company's terminal at Minneapolis, Minn., to connect with terminals constructed by shippers at Superior is planned by Great Lakes Pipe Line Company.

The company also plans a 34-mile 12-inch line from Tulsa to Barnsdall, Okla., to supplement existing 12-inch and 8-inch lines; the replacement with an 8-inch line of the present 14 mile 4-inch from Coffeyville to Independence, Kansas; and an 11 mile 8-inch from near the Great Lakes pumping station at Donahue, Iowa, to a point adjacent to six existing terminals on the Mississippi river at Bettendorf, Iowa.

Increased capacity to the company's terminal at Mankato, Minn., will be gained by powering present lines at Mason City, Iowa, and by increasing power at Albert Lea, Minn., station which pumps to Mankato. The Chicago terminal also will be modernized.

Other projects previously announced as part of the $15 million financing program include an 84-mile 8-inch extension from Newport, Minn., to shipper terminals at Eau Claire, Wis.; a 12-inch line from Middlebury Junction, Ill., to Chicago; and a 15-mile 6-inch from the company's line at Lincoln, Neb., to the Lincoln air base.

Interprovincial Lets Contract on 156-Mile Line

Interprovincial Pipe Line Company has let contracts for the main line construction of a 156-mile 20-inch extension from Sarnia, Ont., to Port Credit, Ont.

The first 90 miles east of Sarnia has been contracted to Somerville Construction Company of Toronto and the remaining 66 miles to Majestic Contractors Ltd. of Edmonton, Alta.

Estimated to cost $11 million, the project includes one pumping station at Sarnia with a capacity of 111,000 barrels daily. With addition of one more station, capacity can be increased to 186,000 barrels daily. The line will serve the British American Oil Company refinery at Clarkson and the Regent Refining plant at Port Credit.

Salt Lake Pipe Line to Add To Crude and Products Lines

Major expansion of the crude oil line and products systems of Salt Lake Pipe Line Company has been announced. Completion is expected by the end of 1957. Additional capacity of 14,000 barrels daily will be added to the Rangely, Colorado-Salt Lake City crude line with installation of 100 miles of new 10-inch line and additional pumping facilities at existing pump stations. The crude line will handle 70,000 barrels daily.

Capacity of the products line from Salt Lake City to Spokane will be increased by 100,000 barrels daily between Salt Lake City and Boise, Idaho, by installing additional pumping facilities. Capacity of the products line from Boise, Idaho, to Pasco, Wash. will be upped 5000 barrels daily by installing 80 miles of new 8-inch line. When construction is completed, the new throughputs will be 56,000 barrels daily from Salt Lake City and 30,000 barrels daily from Boise.

HYDROSTATIC PIPELINE TESTING

Call Williams FOR A

BUTTONED UP JOB

ONE CALL to Williams and you can forget about testing. Our complete mobile equipment, experienced testing engineers, and 24-hour crews handle the entire testing procedure from preliminary engineering to making final reports.

Developed by Williams, this packaged service has been used by major pipeline companies on some of the longest and largest lines in the country.

Use Williams hydrostatic testing on new pipeline construction, rehabilitation of old lines, compressor stations, processing installations and plant expansion.

Call Shreveport 4-2678.

HYDROSTATIC PIPELINE TESTING

2000 Beck Building
Shreveport, Louisiana

Williams
PRESSURE SERVICE COMPANY

For more data on advertised products, use Readers' Service Cards, last page.

Speeds cross-country pipelines

Take another look at this big, wheel-type ditcher. It's a new addition to Parsons line — the Middle-Inch 420. With it, you get trench widths from 31 to 46 inches, and depths to 7½ feet. A wide range of digging speeds from 5.8 inches up to 44 lineal feet per minute assures maximum trench production at every width, depth, in all materials. Here's more news that will interest you —

A Big-Inch 520

Rounding out a complete line of *Trenchliners for pipeliners*, Parsons also brings you a Big-Inch 520! It digs up to 8½ feet deep, 40 to 52 inches wide, at speeds up to 28 feet per minute. Both of these big, wheel-type Inchers are job-proved. They were originally developed by C-R-C, and now built by Parsons — bringing you the *combined* engineering know-how and services of both firms. Other Trenchliners include smaller wheel-type 150, and ladder types on rubber or crawlers.

PARSONS COMPANY, Division of Koehring

As an auxiliary production unit to the Big and Middle-Inchers, this smaller wheel-type 150 digs laterals, gathering lines, etc., at speeds up to 25 feet per minute. It opens trench 16 to 30 inches wide, 5¾ feet deep. Hydraulic wheel-hoist gives infinite depth adjustments, maintains close grade tolerance.

WANT MORE FACTS?

PARSONS Company, Newton, Iowa

Send us literature on: ☐ *420 Middle-Inch* ☐ *520 Big-Inch* ☐ *150 Trenchliner*

NAME_____

TITLE_____

COMPANY_____

DIVISION _____

STREET_____

CITY, STATE_____

P7006 PI

TRENCHLINERS® for PIPELINERS

Cities Service Proposes $11.4 Million Facilities

Cities Service Gas Company has proposed to construct and operate natural gas facilities in Kansas and Oklahoma estimated to cost $11.4 million and to abandon natural gas service and facilities to Gas Service Company of Kansas City.

Application is now before the Federal Power Commission for authorization to construct a 3600 horsepower addition to the company's Blackwell compressor station in Kay County, Okla., and for 116 miles of pipe line in seven Kansas counties.

Cities Service also proposes to acquire and operate an underground gas storage field in Wilson and Neosho counties, Kansas. The field would have dehydration facilities for 100 million cubic feet of gas daily and 23.5 miles of field pipe line. The company plans to reclaim approximately 195 miles of varying diameter pipe lines in Montgomery, Allen, Anderson, Johnson, Franklin, Miami and Reno counties, Kansas.

Magnolia to Increase Capacity Of West Texas-Gulf Coast Line

Magnolia Pipe Line Company has announced plans to increase its West Texas-Gulf Coast pipe line capacity by 75,000 barrels daily with the addition of loop lines and pumping equipment.

Scheduled for completion during 1958, the project will boost Magnolia's total crude capacity out of Midland, Texas, to 235,000 barrels daily.

With seven major carriers Magnolia took part in a recent investigation which found a large diameter line was needed to meet requirements of the participating carriers. As steel mill schedules prevented completion of the line until 1960, Magnolia decided to increase capacity of its present system for which pipe in smaller sizes could be delivered this year.

Natural Gas Pipeline Lets Contract on River Crossing

Contract has been let for construction of a 20-inch pipe line across the Red River as part of Natural Gas Pipeline Company of America's proposed 350-mile gas pipe line project from Wise County, Texas, to Fritch, Texas.

R. H. Fulton has begun work on the river crossing, which is expected

For more data on advertised products, use Readers' Service Cards, last page.

No problems here !

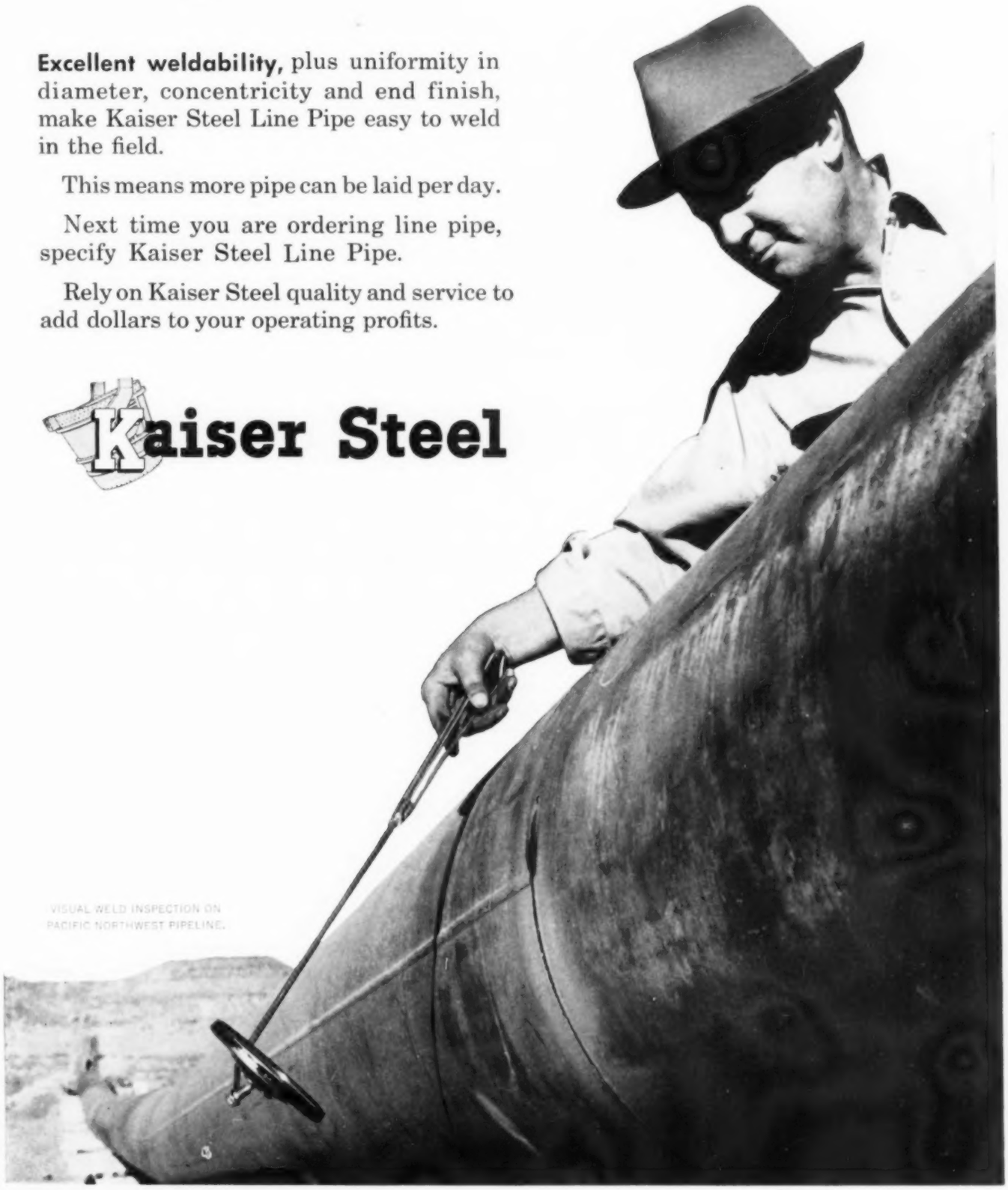
Excellent weldability, plus uniformity in diameter, concentricity and end finish, make Kaiser Steel Line Pipe easy to weld in the field.

This means more pipe can be laid per day.

Next time you are ordering line pipe, specify Kaiser Steel Line Pipe.

Rely on Kaiser Steel quality and service to add dollars to your operating profits.

Kaiser Steel



VISUAL WELD INSPECTION ON PACIFIC NORTHWEST PIPELINE.

Steel Mill Products: plates • hot rolled strip and sheet • cold rolled strip and sheet • tin plate • continuous weld pipe • electric weld pipe • alloy and carbon bars • bar shapes • structural shapes semi-finished steels • pig iron • ingot molds • coke by-products • **Fabricating Division:** steel fabrication for construction, aircraft, missile and other industries • expanded fusion weld pipe reinforced concrete pipe • tanks • For specifications, write: **KAISER STEEL CORPORATION • Los Angeles • Oakland • Seattle • Portland • Phoenix • Denver • Tulsa • New York**

to be completed in late April.

As protection for the proposed pipe line, Natural Gas Pipeline has undertaken construction of 24 erosion dams in Wise and Montague counties, where a severe erosion problem exists. Roland L. Scherer, Weatherford, Texas, has been awarded the contract for building the dams.

In addition, a contract was awarded to Pittsburgh-Des Moines Steel Company, Dallas, for construction of a suspension bridge. Contracts for the pipe line have not been let.

Compressor Station Work Started on California Line

Construction will begin May 1 on a compressor station near Needles, Calif., part of the $33.5 million transmission system underway by Southern California Gas and Southern Counties Gas Companies.

The station will move out-of-state gas through the new 30-inch pipe line now under construction between Needles and Newhall. Construction of 244 miles of line is more than one-fourth completed. Work has progressed 70 miles west from the California border, crossing the Amboy-Needles Road west of Essex. (See PIPE LINE INDUSTRY, September 1956, Page 80).

Designed by M. A. Nishkian & Co., the compressor station is being built 11 miles south of Needles and 8 miles west of the California-Arizona border. The plant will handle the daily load of 278.2 million cubic feet of gas to be transported into southern California. Initially the plant will house four of five 2000 horsepower compressors. Ultimately it is expected to contain ten compressors.

In addition to the 244 miles under construction, the project includes a 49-mile segment between Alhambra and Newhall completed last fall. The over-all line is expected to be in operation by June 30 and the new compressor station is scheduled for completion later this year.

Construction Moves Ahead On Westcoast Transmission Line

Construction is underway on four compressor stations on Westcoast Transmission Company's $170 million natural gas pipe line project through British Columbia.

Work on the line was continued during the winter months and pipelaying, compressor station construction and aerial crossings are now ahead of schedule. The first three stations are more than one-third complete.

Main line pipe installation on the 650-mile line, which will bring gas from the Peace River fields of Alberta and British Columbia to Vancouver and the International border, is now more than 71 percent complete. The northern 120 miles of the line, contracted to Dutton-Williams Brothers Limited, was completed in December. Plans are underway to test this section with natural gas from wells in nearby Kiskatinaw gas field.

The Westcoast line will carry initially 400 million cubic feet of gas a day. By addition of compressor stations the capacity can be increased to 660 million cubic feet a day.

Other contractors on the line are Canadian Bechtel Limited, Conyes Construction Corporation and Mannix Limited. Canadian Bechtel Limited is acting as managers of engineering and construction.

When Overloads *STRIKE* Gas Transmission or Distribution Line Scrubbers . . .

. . . Aerotec Dry Gas Scrubbers easily handle it without loss of efficiency.

Up to 100% overload can be handled by Aerotec Gas Scrubbers while still maintaining normal efficiency. Some of the features which contribute to the wide acceptance of these unique and outstanding scrubbers are:

Delivery of gas, free from dust and liquid carryover.

Small size for equivalent volumes as compared to conventional types.

Simplicity of installation and operation.

Convenient manifolding to any capacity.

Contact our Project Engineers for information and aid on your gas cleaning problem.

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.
(Offices in 38 principal cities)
Canadian Affiliates: T. C. CHOWN, LTD., 164 Metcalfe Ave., Westmount, Montreal 6, Que.
Manufacturers
THE AEROTEC CORPORATION
Greenwich, Conn.

ALCO TRIMS WEIGHT BOOSTS POWER CUTS COSTS IN MODERN 251 DIESELS

The ALCO 251 diesel is made for today's requirements of stationary service. Its base and block are rugged weldments for lower weight, higher strength than old-time castings. Four-point mounting eliminates grouting and heavy foundation costs. Use of modern proven materials in the power section extends the life of the 251 diesel, too, and maintenance is easier and less costly.

More power per pound is provided by improved fuel injection, modern turbosupercharging plus an air aftercooler. The basic 251 diesel can be easily adapted to any stationary service by simply adding standard parts, including dual fuel, and it is especially suitable for automatic or remote operation.

ALCO's regional warehouses — seven located throughout the country — give speedy service on parts orders. This, plus the fact that all models of the 251 diesel have interchangeable parts, means that your parts inventories can be kept low.

If you would like more information on the advantages of the ALCO 251 diesel, contact your nearest ALCO sales office, or, if you wish, write for Bulletin DE-6 to Transportation Products Division, Dept. TR-3, P. O. Box 1065, Schenectady 1, N. Y.

Condensed Specifications for ALCO 251 Diesels

No. Cyl.	Bore and Stroke (in.)	RPM Range	BHP Range	Approx. Wt Dry (lb)
6	9 x 10½	350-1000	550-900	22,100
12	9 x 10½	350-1000	1100-1800	32,650
16	9 x 10½	350-1000	1470-2400	42,000

ALCO

ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities

Locomotives • Diesel Engines • Nuclear Reactors
Heat Exchangers • Springs • Steel Pipe • Forgings
Weldments • Oil-Field Equipment

Florida Natural Gas Project Receives Final Approval

Coastal Transmission Corporation and Houston Texas Gas and Oil Corporation have met the rate conditions set by the Federal Power Commission recently in its conditional approval of the two companies' project to bring natural gas service to Florida.

Both companies are now proceeding with financing and construction is expected to begin this summer with gas service to Florida to begin by June, 1958.

The FPC had issued conditional approval for construction of a 1516-mile line from the Rio Grande Valley of Texas to Miami, giving the companies 30 days to meet requirements regarding tariffs and financing. (See PIPE LINE INDUSTRY, February 1957, p. 64.)

Coastal will build 574 miles of main line from near McAllen, Texas, to Baton Rouge plus 414 miles of laterals. From there Houston Texas Gas & Oil will take the gas on to Florida through a 942-mile main line and 682 miles of laterials in Florida. The entire project will cost $148.9 million.

Coastal will supply all requirements of Houston Gas. Deliveries initially will average 248.6 million cubic feet per day. Approximately 150 million cubic feet of this gas will go to two large power companies in Florida under a transportation arrangement.

Pipe Line Crossings Data Assembled by ASCE

Standard specifications for pipe lines crossing highways and railroads are being studied by a special committee of the Pipe Line Division of the American Society of Civil Engineers.

Although not a code-writing group, the committee will study and assemble information contributed by all interested organizations and present tentative specifications to the American Standard Association as a suggested standard code for pipe lines under crossings of railroads and highways.

The ASCE committee is composed of representatives of gas, oil, products, pipe line, and railroad industries, and state and national agencies and organizations concerned with the problem.

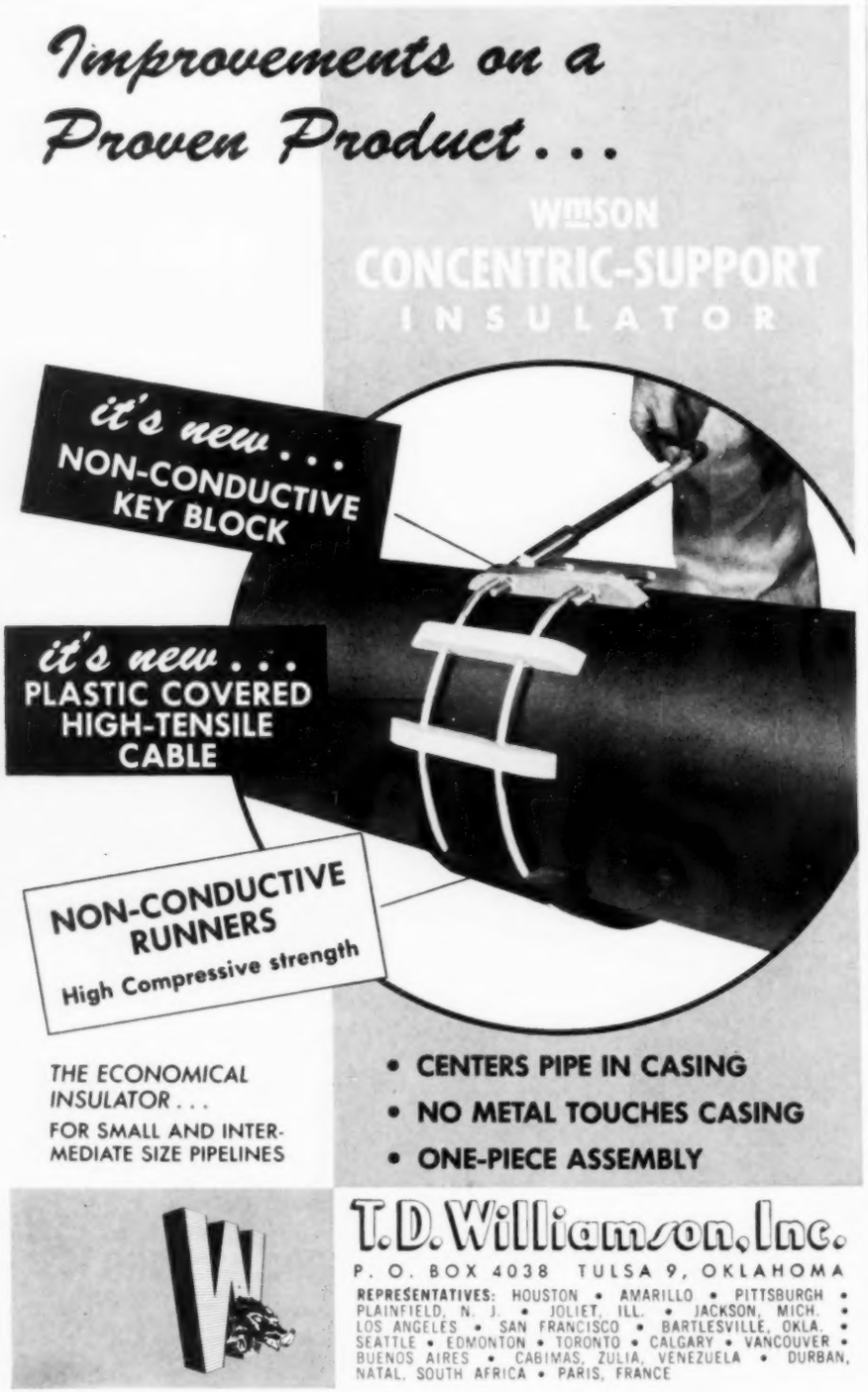
The study was started in the belief that a properly developed standard could facilitate issuance of permits of railroads and highways and would assure railroad and highway departments of well-engineered crossings. Varying specifications now in use for crossings have made it increasingly difficult for pipe line companies to place orders for materials in advance, the ASCE committee finds.

J. E. Thompson, superintendent of pipe line construction, Natural Gas Pipeline Company of America, 122 South Michigan, Chicago, is chairman of the committee.

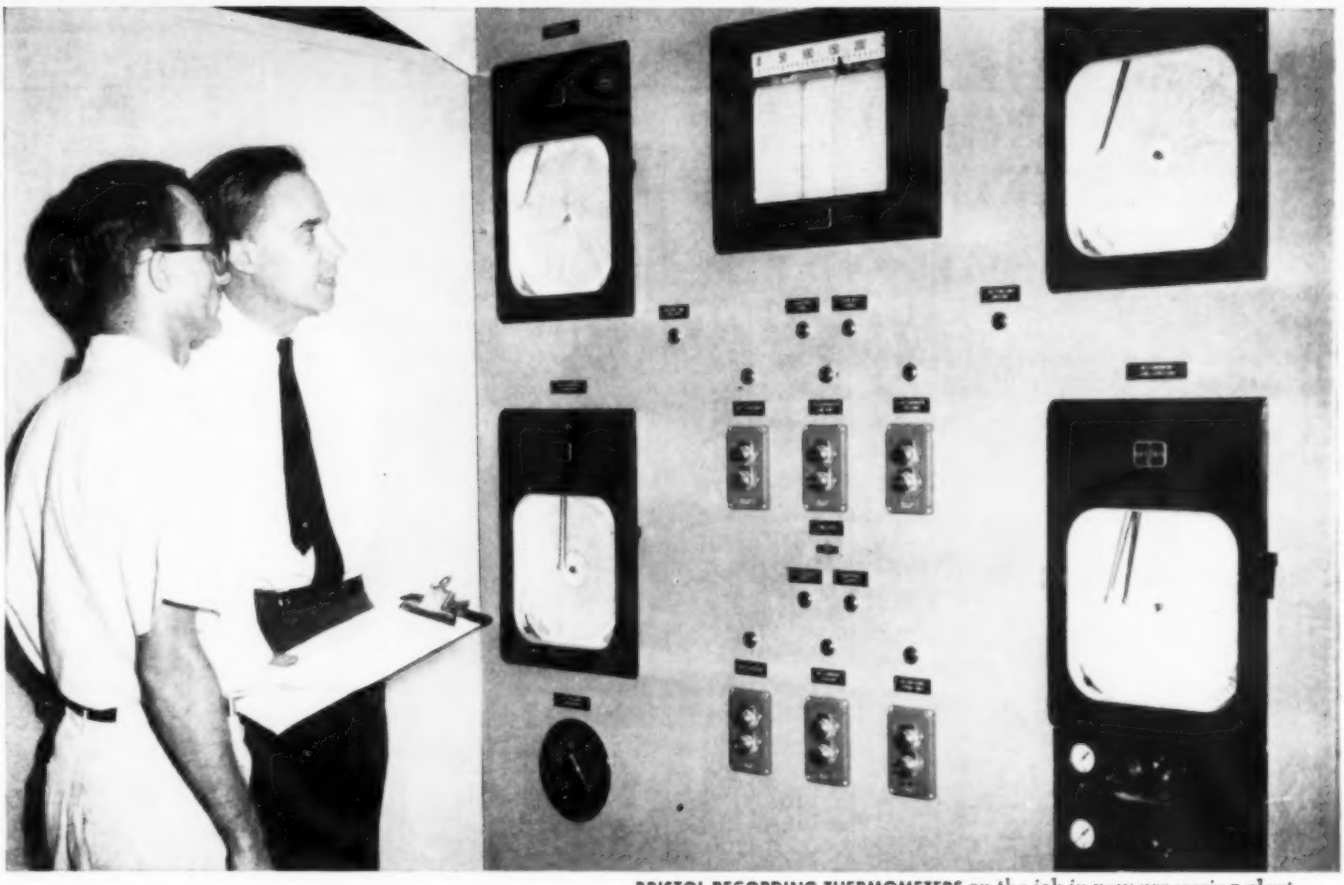
West Texas-to-Gulf Coast Crude Line to be Built

A group of oil companies shipping crude from the West Texas area to the Gulf Coast is making plans to construct a new pipe line from the Midland, Texas, area to the coast. The line is expected to move between 400,000 barrels daily and 500,000 barrels daily to the Houston refining area.

Among the initial group planning the line was Magnolia Pipe Line Company, who recently dropped out to concentrate on expansion of its own system using smaller diameter pipe. It was reported that delivery for the larger pipe to be used in the group project will delay completion of the line for 2 or 3 years.


Improvements on a Proven Product...
WILSON
CONCENTRIC-SUPPORT
INSULATOR
it's new... NON-CONDUCTIVE KEY BLOCK
it's new... PLASTIC COVERED HIGH-TENSILE CABLE
NON-CONDUCTIVE RUNNERS
High Compressive strength
THE ECONOMICAL INSULATOR...
FOR SMALL AND INTERMEDIATE SIZE PIPELINES
• CENTERS PIPE IN CASING
• NO METAL TOUCHES CASING
• ONE-PIECE ASSEMBLY
T.D.Williamson,Inc.
P. O. BOX 4038 TULSA 9, OKLAHOMA
REPRESENTATIVES: HOUSTON • AMARILLO • PITTSBURGH • PLAINFIELD, N. J. • JOLIET, ILL. • JACKSON, MICH. • LOS ANGELES • SAN FRANCISCO • BARTLESVILLE, OKLA. • SEATTLE • EDMONTON • TORONTO • CALGARY • VANCOUVER • BUENOS AIRES • CABIMAS, ZULIA, VENEZUELA • DURBAN, NATAL, SOUTH AFRICA • PARIS, FRANCE

WHAT'S NEWS AT BRISTOL...



BRISTOL RECORDING THERMOMETERS on the job in new processing plant.

Can you pass this recording thermometer quiz?

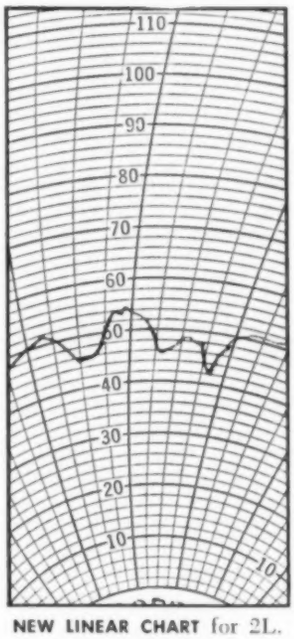
Question: ***Why do Bristol Recording Thermometers continue to lead the field?***

Answer: ***Because of Bristol's continuous research and development program. Two outstanding results of this program are:***

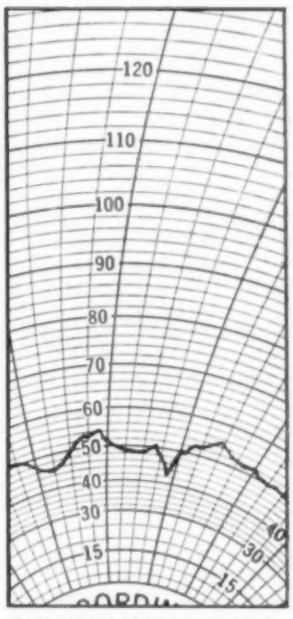
1. The 2L Uniform-Scale Vapor Pressure Thermometer which gives you all the advantages of vapor pressure thermometer actuation without the problems of the conventional non-linear increasing scale—*greatest advance in recording thermometers in 25 years.*

2. A basic improvement that eliminates ambient temperature effects. Whether you are measuring *above, below* or *at* ambient temperature, you get the same unvarying accuracy with the new Bristol Vapor-Pressure Recording Thermometers.

Want to know more? Write today for free 48-page bulletin T840 on the complete line of Bristol Recording Thermometers, liquid, vapor-pressure, and gas filled for every application. It tells all about typical installations, ranges, charts, bulbs, tubing. The Bristol Company, 114 Bristol Road, Waterbury 20, Conn.



NEW LINEAR CHART for 2L. Note easy readability due to equal chart increments.



OLD NON-LINEAR CHART. Note how scale values crowd together at bottom.

6.82

BRISTOL

TRAIL-BLAZERS IN PROCESS AUTOMATION

BRISTOL'S

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Proposed Pipe Line Construction

COMPANY	Length in Miles	Diameter	Type	Origin and Terminus	Estimated Cost	Status
Alberta Gas Trunk Line, Ltd.	116	18, 34	Gas	To connect with Bindloss and Provost fields	.....	Planned
Alaska-Yukon Refiners and Distributors, Ltd., Edmonton, Alta.	....	....	Products	Serving Alaska and Yukon Territory	.....	Planned
British Petroleum Company	....	16	Crude	Popton Point, South Wales, to Llandarcy refinery	$14 million	Considered
Central Hudson Gas & Electric Corp., Poughkeepsie, N.Y.	46	10	Gas	Albany to Kingston, N.Y.	.....	Planned
Cie. de Recherches et d'Exploitation de Petrole du Sahara	500	....	Crude	Through Sahara Desert of Algeria, through Tunisia to Libyan border	.....	Considered
Cities Service Gas Co., Oklahoma City	116	....	Gas	Facilities in Kansas and Oklahoma and pipe lines in Kansas	$11.4 million	Before FPC
Coastal Transmission Corp.—Houston, Texas	565	20-26	Gas	McAllen, Texas—Louisiana connection, Houston, Texas Gas, plus 272 miles of laterals	$68 million	Authorized
Colorado Interstate Gas Co., Colorado Springs, Colo.	734	22-34	Gas	Texas & Oklahoma Panhandle to Kit Carson, Colo., to Beatrice, Neb.	$87 million	Before FPC
	36	26	Gas	East Denver to South Denver station and loop of Portland lateral	$1.3 million	Authorized
Compania Shell de Venezuela	177	20	Gas	La Paz field to Cardon refinery on Paraguana peninsula	$20 million	Contract let
Consolidated Gathering Systems, Ltd.	198	....	Crude	Sturgeon Field—Edmonton.	.....	Planned
Creole Petroleum Corp.	94	28	Crude	Temblador to Caripito, Venezuela	$5.6 million	Planned
Deep Rock Gas Co.	120	6	LPG	Tioga, N.D.—Canadian border	.....	Planned
El Paso Natural Gas Co.	290	6-34	Gas	Facilities in Texas, New Mexico, and Arizona to deliver gas near Blythe, Calif. and Topock, Ariz. to So. Counties Gas Co., So. Calif. Gas Co. and Pacific Gas & Electric Co.	$107 million	Before FPC
	108	....	Gas & Products	Facilities in Andrews and Ector Counties, Texas	$5 million	Authorized
	28	10	Gas	Nolan and Coke Counties, Texas, plus compressor station facilities	$1 million	Authorized
El Paso Natural Gas Products Co.	240	8	Products	Midkiff natural gasoline plant in Permian Basin to El Paso	.....	Planned
Four Corners Pipe Line Co.—Houston	600	16	Crude	From Four Corners Area to Los Angeles plus 150 miles of feeder lines	$50 million	Planned
Gaz de France	550	12-24	Gas	Main line from Lacq field to Paris plus 450 miles of branch lines to Lyons, Nantes and Chateaurous	.....	Planned
Great Lakes Pipe Line Co., Kansas City, Mo.	84	8	Products	Extension of system to Eau Claire, Wisc.	.....	Planned
	68	12	Products	From intersection of system with Badger Pipe Line, into Chicago.	.....	Planned
	140	8	Products	From company's terminal at Minneapolis to terminals at Superior, Wisc.	.....	Planned
	34	12	.....	Tulsa to Barnsdall, Okla.	.....	Planned
	14	8	.....	Coffeyville to Independence, Kansas	.....	Planned
	11	8	.....	East of Great Lakes pumping Station at Donahue, Iowa, to Bettendorf, Iowa	.....	Planned
Houston Texas Gas & Oil Co.—4604 Main St., Houston	961	12-30	Gas	Baton Rouge, La. to Miami, Fla. plus 496 miles of laterals and compressor facilities	$105 million	Authorized
International Petroleum Co.	180	....	Crude	Pasto, Colombia, to Pacific port of Tumaco	.....	Considered
Interprovincial Pipe Line Co.	156	20	Crude	Sarnia, Ont. to Toronto, Ont.	$26 million	Contract let
Iraq Government	150	....	Gas	Kirkuk field to Baghdad	.....	Considered
Iraq Petroleum Co.	1,200	34-36	Crude	Two parallel lines from Kuwait through Iraq to Mediterranean	.....	Considered
Iron Ranges Natural Gas Co.	115	....	Gas	From Itasca and St. Louis Counties along route of Mesabi range from Grand Rapids to Aurora, Minn.	$5 million	Before FPC
Iroquois Gas Corp.—Buffalo, N.Y.	36	....	Gas	Facilities in Chautauqua, Cattaraugus and Erie counties, N.Y. to develop new underground storage area.	$2.5 million	Authorized
Israel Government	....	....	Crude	Extension of Elath-Beersheba line to Mediterranean	.....	Planned
Lone Star Gas Co. Dallas	230	22-26	Gas	Cotton County, Okla. to Fritch, Texas	$18.7 million	Before FPC
Magnolia Pipe Line Co.	....	....	Crude	Loops and Additional pumping equipment on Midland to Beaumont line	.....	Planned
Michigan-Wisconsin Pipe Line Co.—500 Griswold, Detroit	472	4-24	Gas	Main line loops and extensions in Wisconsin, Illinois	$17.6 million	Before FPC
Midwestern Gas Transmission Co., Houston, Texas	1112	....	Gas	Emerson, Manitoba—Nashville, Tenn.	$98 million	Before FPC
Mississippi River Fuel Co.—St. Louis	125	....	Gas	Loops along existing parallel lines in La. and Texas to St. Louis plus additional station horsepower	$12 million	Before FPC
Natural Gas Pipe Line Co. of America—20 N. Wacker Dr., Chicago	350	20, 26	Gas	Wise County, Texas—Fritch, Texas	$28.5 million	Some contracts let
	25	....	Gas	Quinduno field in Roberts County, Texas	$3.2 million	Authorized
	416	36	Gas	Loops at various points along existing line	$76.2 million	Before FPC
North Carolina Natural Gas Corp.	575	3-16	Gas	Mooresville eastwardly across North Carolina	$13 million	Authorized
Northern Natural Gas Co.—2223 Dodge St., Omaha	167	24	Gas	Farmington, Minn. to Duluth, Minn. and Superior, Wis.	$12 million	Before FPC
	42	10	Gas	Rochester, Minn. to Winona and Goodview, Minn.	$963,000	Before FPC
North-West Pipelines Co.	200	....	Crude	Wilhelmshaven on North Sea to Ruhr area of Germany	$46 million	Approved
Northwest Pipeline Corp.	350	6-10	Crude & Products	Four Corners area to Salt Lake City, Utah	$15 million	Planned
Offshore Gathering Corp., Houston	364	24, 26, 30	Gas, Crude	Texas side of Sabine River 25 miles offshore La. to Mississippi side of Pearl River	$150 million	Planned
Ohio Fuel Gas Co., Columbus	19	6-16	Gas	Loops on existing line to serve Dayton and Toledo areas and extension to McCutchenville, Ohio	$772,360	Authorized
	31	....	Gas	Plus storage facilities in Vinton, Holmes, Medina, Wayne, and Ashland Counties, Ohio	$2.5 million	Authorized
Ohio Oil Company, Findlay, O.	....	....	Products	Wood River, Ill. to Chicago	.....	Planned
Oklahoma Natural Gas Co., Tulsa	16	8	Gas	Connect gas supplies in Gotebo field, Okla., to Clinton System in Western Okla.	$350,000	Planned
Pacific Gas & Electric Co.	223	34	Gas	Various loops, between Topock, Ariz.—Milpitas, Calif.	$20 million	85 miles let
	200	12	Gas	Northern California gas fields to Humboldt County, California	$9.5 million	Planned
Pacific Northwest Pipe Line Corp.—Salt Lake City, Utah	50	4-6	Gas	To serve industrial customers at Uravan and Nucla, Colo.	$1 million	Authorized
	1000	....	Gas	Gathering system in San Juan Basin and sales laterals in Washington plus compressor facilities	$30 million	Planned
Pembina Pipe Line, Ltd.	100	3-12	Crude	Gathering line and new pumping unit in West-Central Alberta	$4.5 million	Contract let
Pennsylvania Gas Co.	38	8, 10	Gas	In Erie and Warren Counties, Penn., and Chautauqua County, N.Y.	$930,000	Before FPC
Permian Basin Pipeline Co., Omaha, Neb.	83	16	Gas	Facilities near Spraberry compressor station, Midland County, Texas, to tie in with Pioneer Gathering System, Schleicher County, Texas.	$5 million	Before FPC
Piedmont Gas Co.—Hickory, N.C.	78	2-8	Gas	From connection with Transcontinental Gas Pipe Line to serve customers in North Carolina	$2.6 million	Before FPC
Royalite Oil Co.—Calgary	350	....	Crude	Athabasca tar sand plant in Northeastern Alberta to Edmonton	.....	Planned
Salt Lake Pipe Line Co.—Salt Lake City	100	10	Crude	Plus additional pumping facilities on Rangely to Salt Lake City line	.....	Planned
	80	8	Products	New line from Boise, Idaho, to Pasco, Wash. plus additional pumping facilities on Salt Lake City to Spokane line	.....	Planned
Scranton-Spring Brook Water Service Co.	27	12	Gas	Hebron-Greenwich facilities of TGT to Scranton and Wilkes-Barre, Pa.	$1.6 million	Authorized
Southern Natural Gas Company	52	....	Gas	Various locations in Ga. and La.	$2.2 million	Authorized
Stanmount Pipe Line Co.	140	10	Crude	Caviga and Beaver Lake Fields, N.D. to connect with Interprovincial Pipe Line	.....	Planned
Sui Gas Transmission Co.	145	....	Gas	Sylhet to Dacca, East Pakistan	$9 million	Considered
Tecumseh Pipeline Co.	190	20	Crude	To connect to principal crude line carriers in Chicago area for movement to east	.....	Planned

More than 325,000 horsepower of

I-R CENTRIFUGAL COMPRESSORS

for NATURAL GAS SERVICE

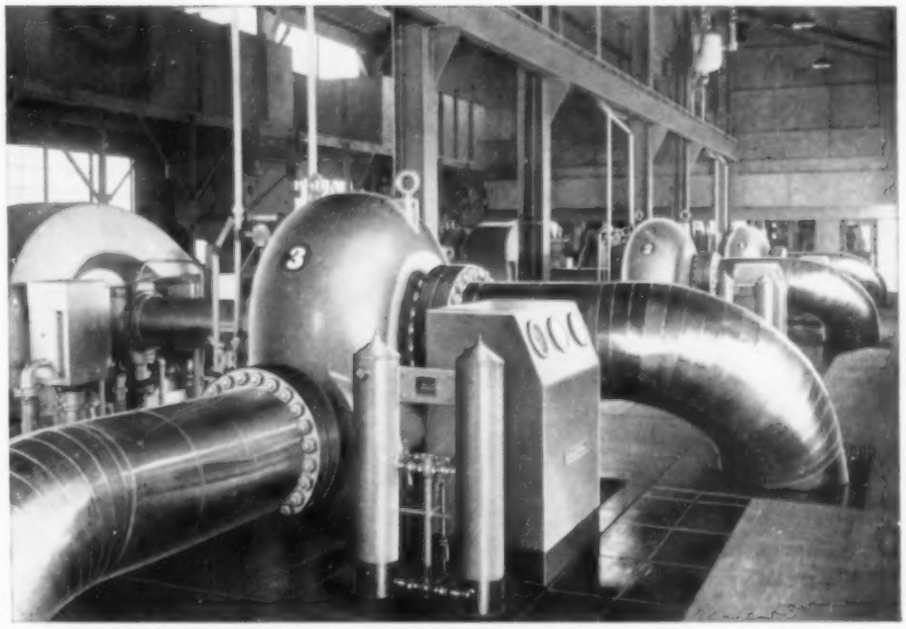
I-R *"FIRSTS"* in Centrifugal Gas Compressor History

FIRST CENTRIFUGAL PIPE-LINE COMPRESSOR Built by Ingersoll-Rand in 1931, this centrifugal pipe-line booster consists of a six-stage compressor driven by a 3550 rpm, 3000 hp motor, all encased in a pressure vessel.

FIRST COMMERCIAL APPLICATION of centrifugal pipe-line compressors was made in 1947. A total of 78 electric-motor-driven, single-stage I-R centrifugals were installed, to handle approximately 250 mmcfd.

FIRST GAS-TURBINE-DRIVEN UNIT Installed in 1949, this Ingersoll-Rand centrifugal compressor, powered by an 1850 hp simple cycle combustion gas turbine, was the first gas-turbine-driven centrifugal compressor developed and applied to pipe-line service, and was designed for a flow of 192 mmcfd at a ratio of 1.18.

FIRST 2000 PSI CENTRIFUGAL GAS COMPRESSOR This Ingersoll-Rand 5000 hp double-case centrifugal compressor was the first unit ever built for handling natural gas at a discharge pressure of 2000 psi.



Three of 8 Ingersoll-Rand centrifugal compressors installed on a large natural gas pipe-line. Each unit is driven by a 5000 hp gas turbine.

This experience means MAXIMUM DEPENDABILITY in modern pipe-line service

FROM the very first pipe-line installation, Ingersoll-Rand has pioneered in the development of centrifugal gas compressors for higher and higher capacities and pressures. And every step of the way, dependability of performance has been a prime consideration in every detail of design and construction. This is why more I-R Centrifugal Compressors have been sold for natural gas service than any other make . . . . a total exceeding 325,000 hp for this service alone.

Backed by such long and successful experience, the modern I-R centrifugal gas compressor is your best assurance of trouble-free performance and long-range economy in gas transmission service.

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

12-319

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO-BLOWERS CONDENSERS
CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

For more data on advertised products, use Readers' Service Cards, last page.

Proposed Pipe Line Construction—(Continued)

COMPANY	Length in Miles	Diameter	Type	Origin and Terminus	Estimated Cost	Status
Tennessee Gas Transmission Co.—Box 2511, Houston (See also Midwestern Gas Transmission Co.)	100	....	Gas	Gathering lines in Texas and Louisiana plus station additions	$18.6 million	Before FPC
	1085	12-30	Gas	Southeast La. to Portland, Tenn.; from Kinder, La., to offshore wells in Gulf of Mexico; from Coudersport, Penn., to Hamburg, N.Y., and loop lines in Ky., W. Va., Penn.; compressor stations in Miss., Tenn., N.Y., Penn.; and additions in Tenn., Ky., Ohio, and Penn.	$166 million	Before FPC
Texas Eastern Transmission Corp. and Texas Eastern Penn-Jersey Trans. Corp.	137	30	Gas	Loops along line from Kosciusko, Miss., and Uniontown, Penn., and 40 miles of lateral supply lines plus addition of 67,610 horsepower compression facilities to systems	$30.3 million	Before FPC
Texas Gas Transmission Corp.	40	6-30	Gas	Parallel lines and compressor additions on existing lines in Louisiana, Missouri, Mississippi, Illinois, Kentucky	$6 million	Authorized
	....	....	Gas	To deliver gas from four Louisiana gas fields to American Louisiana system.	$783,100	Authorized
	13	20	Gas	East Lake Palcurde line, Assumption Parish, to Thibodeux area, Lafourche Parish, plus metering facilities	$1.5 million	Authorized
Texas Illinois Natura .Gas Pipeline Co., Chicago	38	36	Gas	Loops facilities in Illinois	$6.4 million	Authorized
Texas-New Mexico Pipe Line Company, Houston	515	16	Crude	Extension from Jal, N. Mex., pump station to Four Corners.	.....	Planned
Trans-Canada Pipe Line, Ltd.—Calgary, Alberta	2250	30, 36	Gas	Alberta—Eastern Canada	$378 million	Contracts let for 6 spreads
Transcontinental Gas Pipeline Corp.—Houston	287	....	Gas	Loop lines and gathering laterals in Texas and compressor facilities in La., Miss., Ala., Ga., N.C. and Va.	$61.5 million	Before FPC
	28	16	Gas	Lateral in Cameron Parish, La., to take Transco's first offshore gas purchase	.....	Before FPC
Trans-Europe Pipe Line	500	30	Crude	Mediterranean to northern Europe	.....	Considered
Trans-Mountain Pipe Line Co.—Vancouver, B.C.	100	30	Crude	Loops parallel to existing line east of Kamloos, B.C. and west of Edson, Alta. and station facilities.	.....	Planned
Union Gas Co. of Canada	142	26	Gas	Dawn storage area to Hamilton, Ontario plus branch lines	.....	Planned
United Gas Pipe Line Co.—Shreveport	40	8	Gas	From Baldwin County, Ala. to Container Corp. of America plant, Brewton, Ala.	$1.2 million	Before FPC
United Natural Gas Co.	50	12	Gas	Elk County—Jefferson County, Pa.	.....	Planned
Washington Gas Light Co.—Washington, D.C.	28	20, 24	Gas	From metering station of Atlantic Seaboard Corp. to Washington to connect with line leading to District of Columbia facilities	$3.4 million	Authorized
Westcoast Transmission Company, Ltd., Calgary	270	8-26	Gas	Various locations in Peace River region	.....	Contracts let for 155 miles
	174	30	Gas	Savanna Creek gas field, Alberta, to British Columbia border	.....	Planned
Westspur Pipe Line Co.	20	12	Crude	Alida to Carnduff-Glen Ewen area of Saskatchewan plus 34 miles of gathering line	.....	Planned
	75	16	Crude	Loop line in southeastern Saskatchewan	.....	Planned
Winnipeg and Central Gas Co.	450	4-8	LPG	Tioga, N.D.—Winnipeg, Canada	$20 million	Planned
Yacimientos Petroliferos Fiscales	808	....	Gas	Campo Duran, to Buenas Aires, Argentina	$76 million	Planned
	621	....	Crude	Mendoza to San Lorenzo, Argentina	$19 million	Planned
Yacimientos Petroliferos Fiscales Bolivia	86	....	Crude	Yacuiba to Bermejo, Bolivia	$3 million	Considered

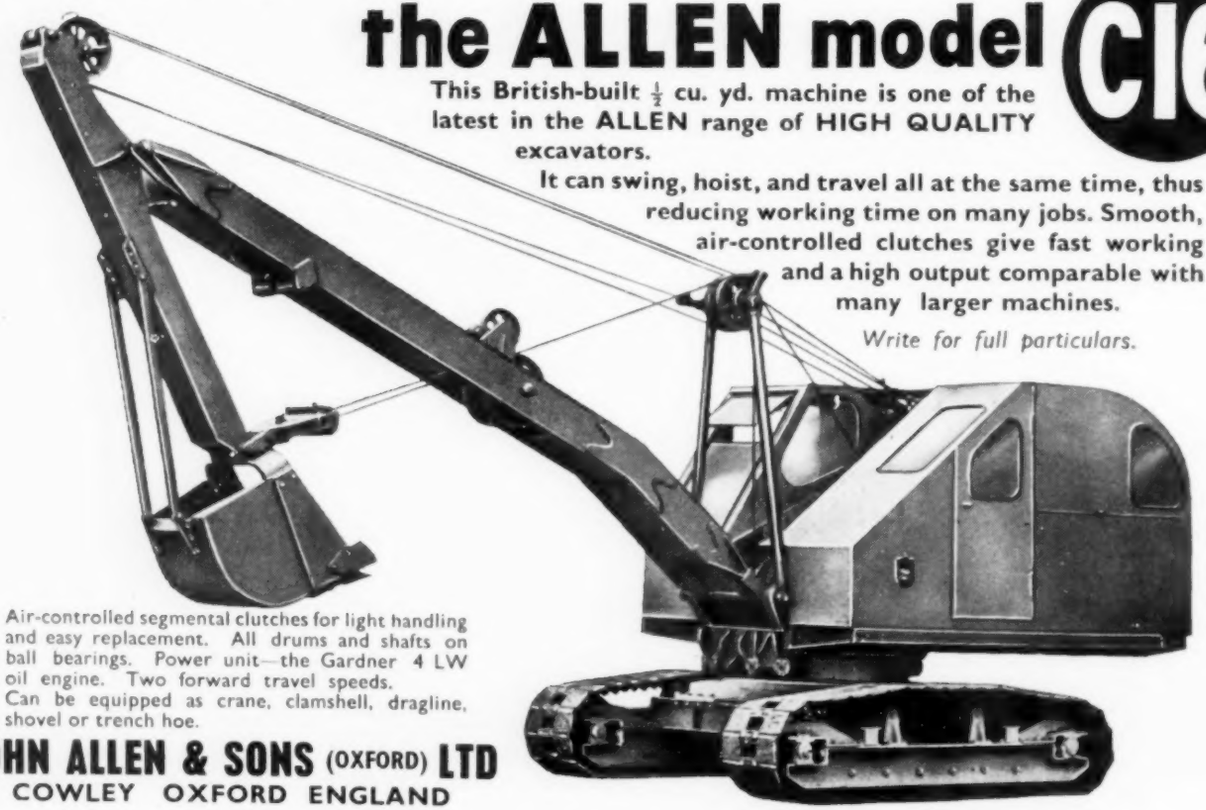
A high-performance crawler excavator

the ALLEN model C16

This British-built ½ cu. yd. machine is one of the latest in the ALLEN range of HIGH QUALITY excavators.

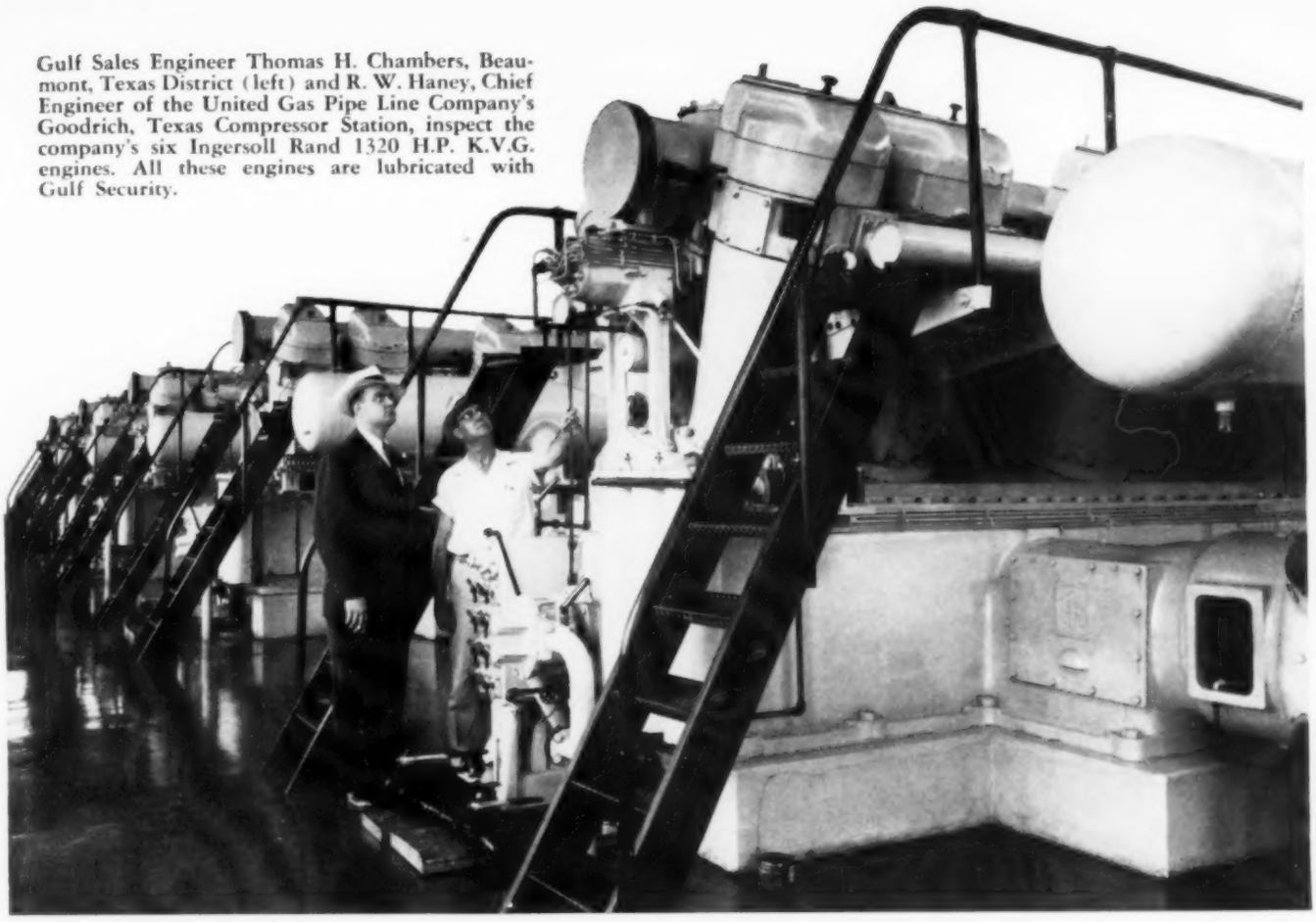
It can swing, hoist, and travel all at the same time, thus reducing working time on many jobs. Smooth, air-controlled clutches give fast working and a high output comparable with many larger machines.

Write for full particulars.



Air-controlled segmental clutches for light handling and easy replacement. All drums and shafts on ball bearings. Power unit—the Gardner 4 LW oil engine. Two forward travel speeds. Can be equipped as crane, clamshell, dragline, shovel or trench hoe.

JOHN ALLEN & SONS (OXFORD) LTD
COWLEY OXFORD ENGLAND



Gulf Sales Engineer Thomas H. Chambers, Beaumont, Texas District (left) and R. W. Haney, Chief Engineer of the United Gas Pipe Line Company's Goodrich, Texas Compressor Station, inspect the company's six Ingersoll Rand 1320 H.P. K.V.G. engines. All these engines are lubricated with Gulf Security.

Lock out high maintenance costs in your gas transmission plants

with GULF SECURITY

Gulf Security's outstanding record in the lubrication of pipeline gas engine compressor units is your assurance of smooth, continuous operation. In scores of gas transmission plants this high quality straight mineral oil helps prevent operating troubles and contributes to low maintenance costs.

Gulf Security is a non-additive oil that does not cloud liquid filled lubricators of power cylinders, compressor cylinders, and packing glands. After years of operation with Gulf Security, cylinders and piston rings of both compressors and power assemblies show negligible wear, and its excellent oxidation stability helps prevent the formation of acid and resins in the crankcase system.

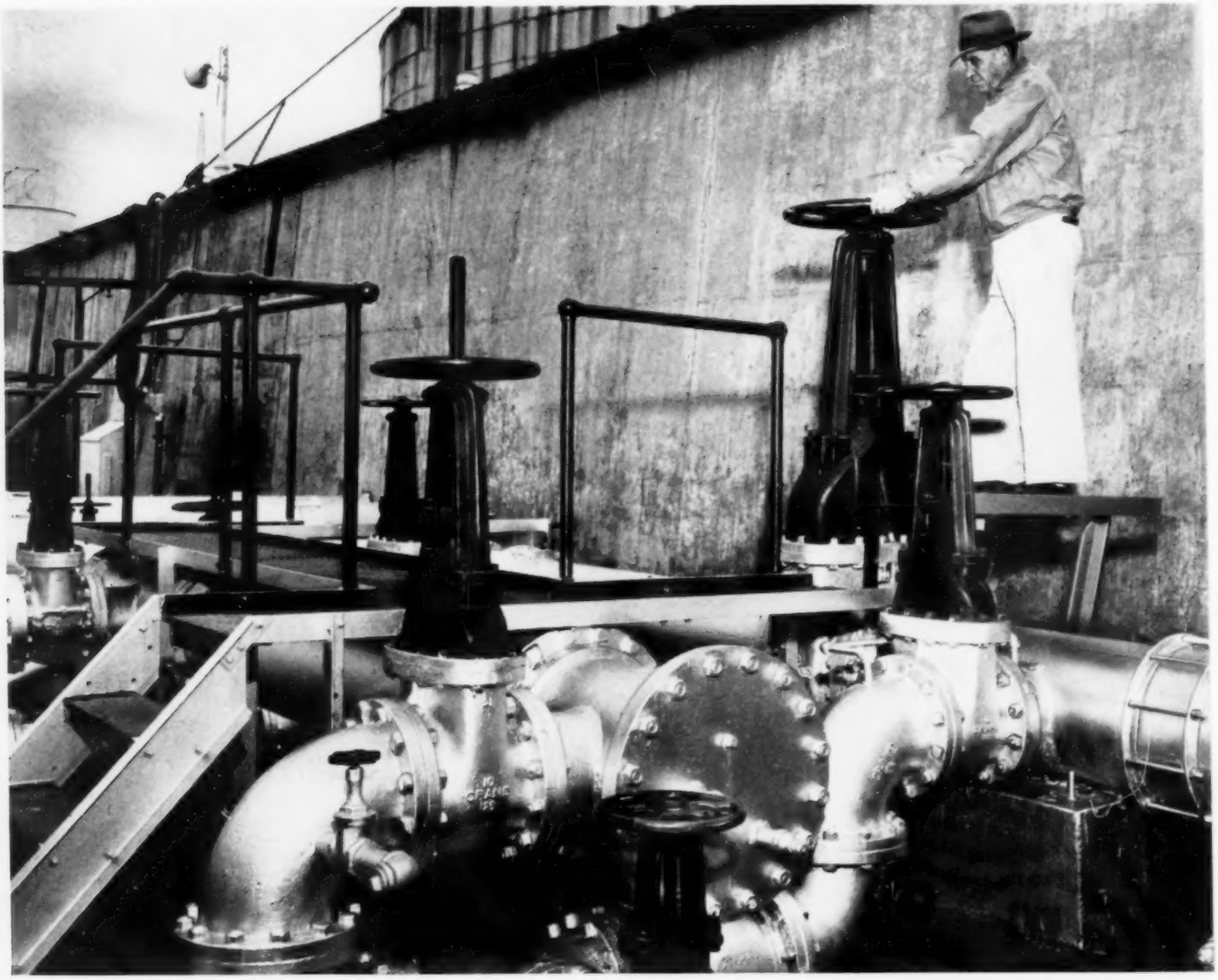
Make certain your units receive safe, effective lubrication protection—specify Gulf Security. And remember that Gulf provides the services of a trained, experienced petroleum expert—the Gulf Sales Engineer—to help you with any problem involving a petroleum product. Consult the telephone directory for the number of your nearest Gulf office.

GULF

Gulf Oil Corporation • Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Another Performance Record for Crane Iron Body Valves



36 years in a busy marine terminal —these Crane valves never in need of repairs

Installed in 1920, the Crane iron body gate valves in this fuel oil suction manifold still have a cost-free service record. To date, not one has needed more than normal stuffing box maintenance.

The General Petroleum Corp. (owner of the installation) marine terminal in Seattle is a big, busy place—no "soft berth" for valves. The big valve, for example, is operated an average of 6 or 7 times daily. Yet, like all other valves in the manifold, it remains completely leak-free and trouble-free.

Outstanding performance? Yes, but not unusual for Crane iron body gate valves. You will find them scoring similar service records in every industry. They're strictly quality-made to give above-average performance at low ultimate cost.

Current model Crane 125-pound iron body gate valves with every desirable feature are available in patterns and sizes for all needs. Next time your Crane Representative calls, be sure to ask him about these valves. Or write to address below for complete information.

You may spot cost-saving ideas in this book of "Valve Performance Facts"—32 case histories throughout industry. Ask your Crane Representative or write for a copy.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855 — Crane Co., General Offices: Chicago 5, Ill.— Branches and Wholesalers in All Areas

Rules of Thumb for the Pipeliner's Notebook

$15 Per Rule of Thumb

These formulae from the pages of engineers' own notebooks yield rough, but reasonably accurate answers for design, maintenance and supply questions. The Editors will pay $15 for your pet Rule of Thumb. Send your Rule of Thumb to PIPE LINE INDUSTRY, P. O. Box 2608, Houston 1.

Miscellaneous —31—How to estimate fuel requirements for internal combustion engines.

When installing an internal combustion engine at a gathering station, a quick approximation of fuel consumptions could aid in selecting the type fuel used.

Using Natural Gas: Multiply the brake hp at drive by 11.5 to get cubic feet of gas per hour.

Using Butane: Multiply the brake hp at drive by 0.107 to get gallons of butane per hour.

Using Gasoline: Multiply the brake hp at drive by 0.112 to get gallons of gasoline per hour.

These approximations will give reasonable accurate figures under full load conditions.

Example: Internal combustion engine rated at 50 bhp —3 types of fuel available.

Natural Gas: $50 \times 11.5 = 575$ cubic feet of gas per hour

Butane: $50 \times 0.107 = 5.35$ gal. of butane per hour

Gasoline: $50 \times 0.112 = 5.60$ gal. of gasoline per hour

Miscellaneous —32—Quick approximations for field use.

The expression V_{mn} frequently used by engineers, is approximately equal to $\frac{m+n}{2}$ when the ratio of m to n is not too far from 1.

By plotting the results, it can be seen that a reasonably accurate answer can be obtained, within these limits:

m n as low as 0.8, results are slightly over 0.6 percent high

m/n as high as 1.47, error will not exceed 2.0 percent

Field calculations often require the value of the sine or tangent of some small angle. For a quick approximation the result will be within the following limits—using sine or tangent = no. of $\frac{\text{degrees}}{57.3}$

Percent of error:

Angle of 9°—sine is 0.4 percent high; tangent is 0.8 percent low

Angle of 14°—sine is 1.0 percent high; tangent is 2.0 percent low

So SIMPLE
We Can
Adapt It
to ANY
LIQUID LEVEL
CONTROL JOB
A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.
MAGNETROL

AS DEPENDABLE AS MAGNETIC FORCE ITSELF

● No matter how specialized the liquid level control application, adapting Magnetrol to meet it presents no problem. Whether it's for high pressures, high temperatures, corrosive liquids or any other condition, a few "standard" modifications and the job is done! Operation is so simple no changes in basic design are needed. That's why Magnetrol "fits" practically any application — why "specials" are so often standard with us.

Because of the utter simplicity and dependability of its magnetic principle, Magnetrol has *infinite operating life.* There are no wearing parts to get out of order.

Magnetrols are available for controlling level changes from .0025-in. to 150-ft., with single or multi-stage switching. Our experienced engineering staff is at your service.

MAGNETROL, Inc.

WHY NOT MAIL THE COUPON—NOW

MAGNETROL, Inc., 21285 Marshall Blvd., Chicago 23, Illinois
Please send me catalog data and full information on Magnetrol Liquid Level Controls.
Name_____
Company_____
Address_____
City_____ Zone____ State____

For more data on advertised products, use Readers' Service Cards, last page.

How to do it

PIPE LINE HINTS

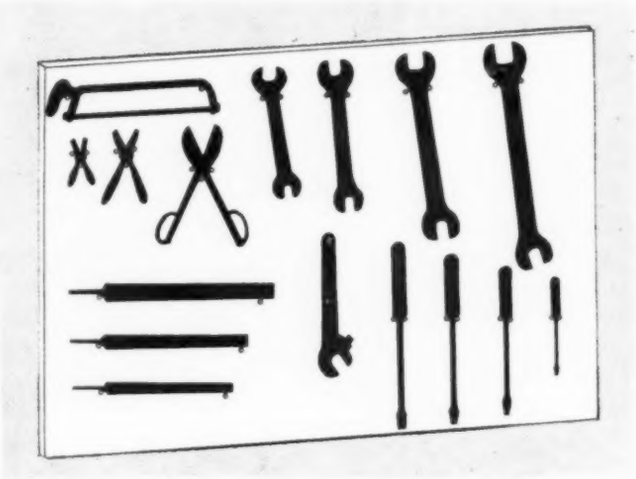
$10 is paid for each illustrated acceptable contribution. Mail to The Editor, PIPE LINE INDUSTRY, P. O. Box 2608, Houston 1, Texas

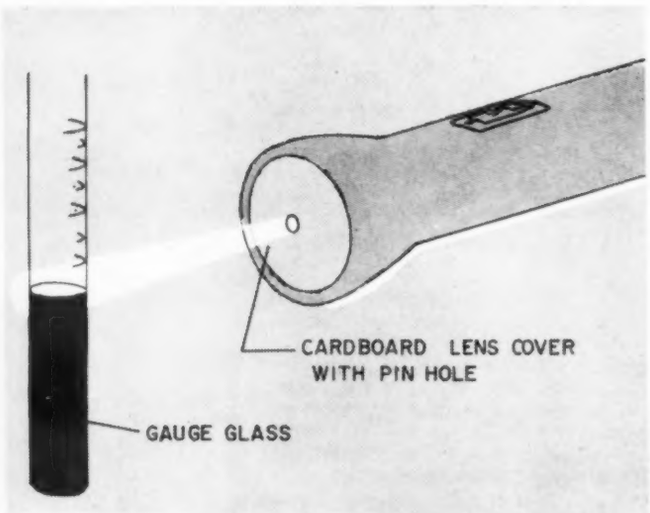
Indexed Tool Board Aids Communications Maintenance

With the multiplicity of tools necessary for communications work shop maintenance, the problem of picking up the right tool for the right job can be time-consuming. A tool board located on the wall near the work bench can speed up tool selection. However, this board will help very little, unless all tools are put in their assigned places after use. To facilitate the proper replacement of tools, prepare this simple tool board.

Hang the tools on the board in the desired arrangement. With the tools hanging in their natural positions, outline with pencil each tool on the board. Remove the tools and paint inside each outline with a color contrasting to the base color of the tool board.

The board will show at a glance the assigned place for any tool missing or being used.





Spotlight Reduces Error In Reading Gage Tubes

Here is a good idea for helping to read gage tubes on calibration tanks—especially when measuring heavy black crude.

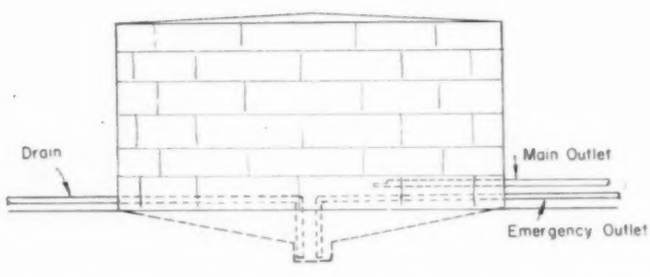
Cut a small hole in a black placard and place the placard over the lens of any standard vapor-proof flash light. There is no need to maintain a special small beam flashlight for the job. For only 10 cents worth of material an ordinary flashlight will make a small intense beam which will serve very satisfactorily.

Sump in Tank Installation Makes Full Use of Storage

By making the bottom of a storage tank an inverted cone, more complete usage can be made of available room.

A small sump can be installed in the center for occasional use in pulling the tank completely down. In this manner, high back gages and the resulting dead storage can be eliminated and a tank might be freed for mixed usage without fear of contamination.

Baffle plates should be installed in the sump to prevent forming of a vortex during emptying. Better stripping of the tank may be accomplished by use of a small positive displacement pump.

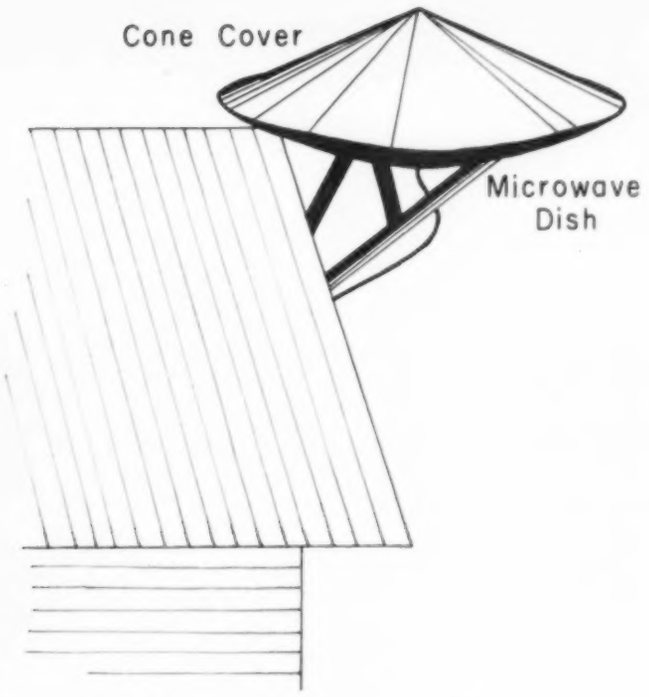


Inexpensive Rack Handles Pipe of Any Length

These handy, portable, pipe racks can be made from scrap plate and pieces of pipe. The cost involved is about one-third that of concrete piers.

Racks can be used for any pipe size, and the pipeyard can be increased simply by adding additional piers. The spacing can be easily adjusted to accommodate any length of pipe to be stored.

When ground space being used for pipe storage is needed for other purposes, the piers can be quickly loaded on a truck for transfer to another location.



Cone-Shaped Canvas Cover Protects Parabolic Antenna

This cone-shaped cover, fashioned from silicone wax impregnated canvas, form-fits the antenna and feed-horn assemblies of a microwave system. It has proved to be an effective way of combatting ice and snow which builds up on outside parabolic antennas during severe winter months.

Previously the antennas had been equipped with heating elements to prevent this ice build-up. Although heaters were adequate under moderate icing conditions, they could not keep up with the more severe build-ups occasionally found. In addition, considerable heating power was wasted on clear, cold days.

These cone-shaped covers are easily installed and can be stored during summer months. Under trial last winter, the covers provided adequate protection under as much as two inches of ice and snow.

Saddle Rack Permits Emptying Drum with Ease

This rack can be made to any convenient height out of scrap pipe and angle iron. Load the drums with a chain hoist or a ramp and roll them down the rack to a saddle at the end.

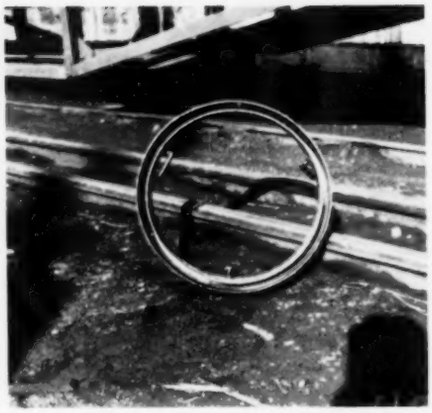
The saddle, having a rotating capacity of about 30 degrees, will permit the emptying of all the lubricant or solvent without the usual mess and labor involved. The turning rod for the saddle is made of 2-inch pipe—the saddle being welded to the 2-inch through slots cut around 3-inch pipe carrying sleeve. The slots and a cross-brace limit the degree of rotation.

A few manhours of labor and some junk pipe will aid greatly in recovering those last few gallons of fluid usually left in a drum.

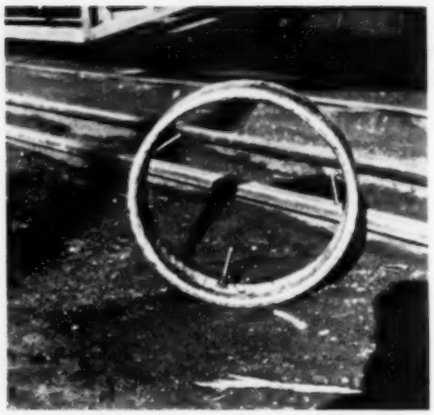
Cap Protects End-Bevel During Pipe Loading

One major company devised these two money-saving methods in order to realize more efficient pipe loading.

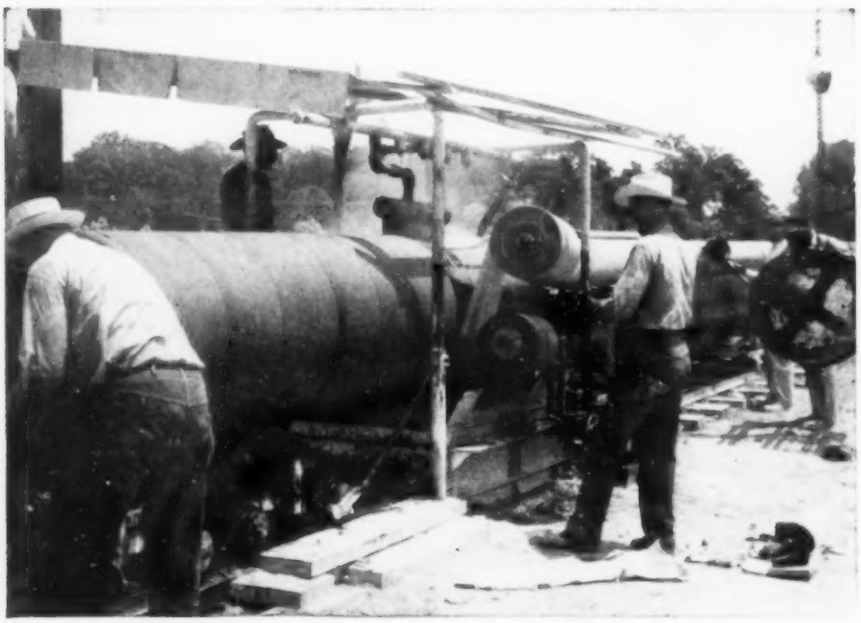
To protect the end-bevel, a specially designed cap was placed on each end of the pipe. The cap is fitted to the pipe by set screws, and with the protective tire and end plate, offers an ideal "buffer" while loading or unloading.



Cap designed to O.D. of pipe.



Set screws hold cap on pipe.



Lowering pipe into ship's hold.

Paint dots indicate pipe length.

In addition to bevel-protection, the cap affords "eyes" for the loading cables. This eliminates the possibility of marking or crimping the pipe by using conventional slings, and gives a wider range of maneuverability.

For smoother pipe-laying operations (lay-barge construction), the pipe was marked according to its length. This was accomplished by painting a dot on the I.D. of the pipe, using different colors for various lengths. For example, under 38 feet, no dot; 38 feet to 40 feet, red dot; 40 feet to 42 feet, white dot.

Lay Pipelines Faster with

RUBEROID LIGHTWEIGHT IMPERIAL

Glass Fiber Reinforced Asbestos Pipeline Felt

Ruberoid's new Lightweight Imperial Pipeline Felt—reinforced with glass threads—is thinner, lighter, easier to handle. With more felt coverage per roll there are fewer machine stoppages for loading. Lightweight Imperial means a faster job from start to finish.

Because of the tough but light glass threads that are added to it, Lightweight Imperial has a greater tensile strength per pound than ordinary felt. And most important of all it's lower in cost.

For extra savings in wrapping pipelines, investigate the lower cost, easier handling, greater strength and faster application of Ruberoid Lightweight Imperial Glass Fiber Reinforced Asbestos Pipeline Felt.

National Distributors:
S. D. DAY COMPANY
Bayou Building
3115 Buffalo Drive
Houston 19, Texas
"Serving All Pipelines"

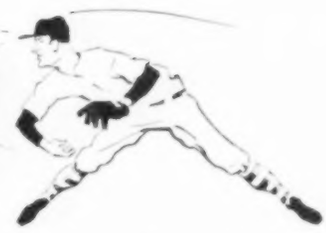
The RUBEROID Co.

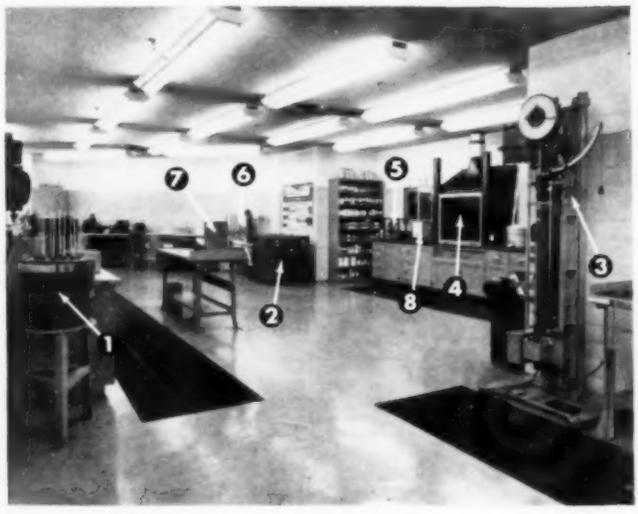
ASPHALT AND ASBESTOS BUILDING MATERIALS

1. Insulation Test Equipment
2. Dielectric Test Equipment

1. Sub-Zero Cabinet
2. Air Permeability Apparatus
3. Zipper Seal Test Tank
4. Analytical Balance

MALONEY MAINTAINS PRECISE CONTROL





1. Comet Aging Block
2. Sub-Zero Cabinet
3. Scott Tester
4. Oil Immersion Apparatus
5. Gravimeter
6. Air Permeability Apparatus
7. High Powered Microscope
8. Drying Oven

These pictures of our newly expanded Research and Development Laboratory will give you some idea of why F. H. Maloney Company for 25 years has had the reputation for "Precision in Rubber — Metals — Plastics." It is the largest and most complete laboratory of its type in the Southwest. Mr. A. S. (Tony) Girala, Chief Development Engineer, who has been with our organization for 20 years, heads up this laboratory and a staff of experienced technicians and research chemists.

This Laboratory is available to our customers for Testing, Research, Development, and Specification-compounding.

While this Laboratory is completely air-conditioned and all testing is done under controlled atmospheric conditions, adjoining this Laboratory is a complete Pilot Plant capable of producing specification rubber under atmospheric conditions, duplicating the conditions that prevail in our rubber manufacturing plants. This Pilot Plant is also under the direct supervision of Mr. Girala.

"Something from the Irishman"

F. H. MALONEY Company

Houston, Texas

2301 TEXAS AVE. • FA 3-3161 • HOUSTON

LOS ANGELES • TULSA • OLEAN, N. Y.

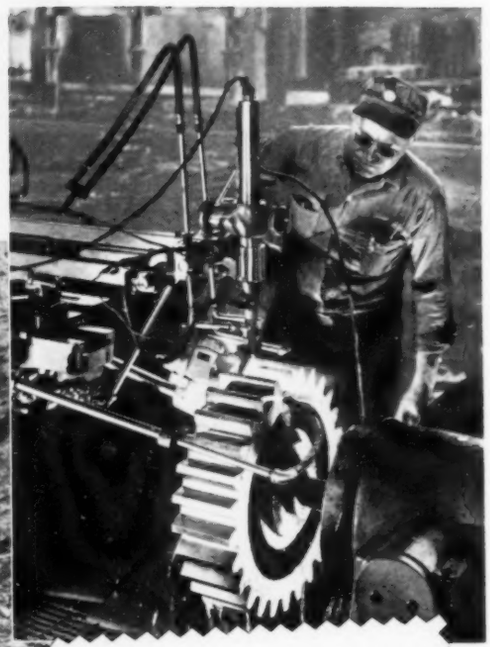
SINCE 1932—PRECISION IN RUBBER—METAL—PLASTICS

Setting the pace for fast-moving spreads . . .

BUCYRUS ERIE

22-B

This ¾-yd. 22-B is trenching on a road approach on the Saskatchewan pipeline in Canada.



Bonus Quality

saves you money

Bonus quality starts with highest grade steel which is flame-hardened to provide long-wearing gears and pinions.

Pipeline spreads fight enough obstacles — remote locations, tough terrain, bad weather — without having to put up with poor equipment. That's why contractors on fast-moving spreads like Bucyrus-Erie 22-B dragshovels — they know these rugged machines will set the pace and help them stay on schedule.

Bucyrus-Erie dragshovels are built for high-speed trenching. Speedy hoist and powerful digging strokes eat up maximum yardage in every shift. Responsive controls let the operator work at peak efficiency with little fatigue. Dipper design assures rapid filling and heaped loads, and clean fast dumps.

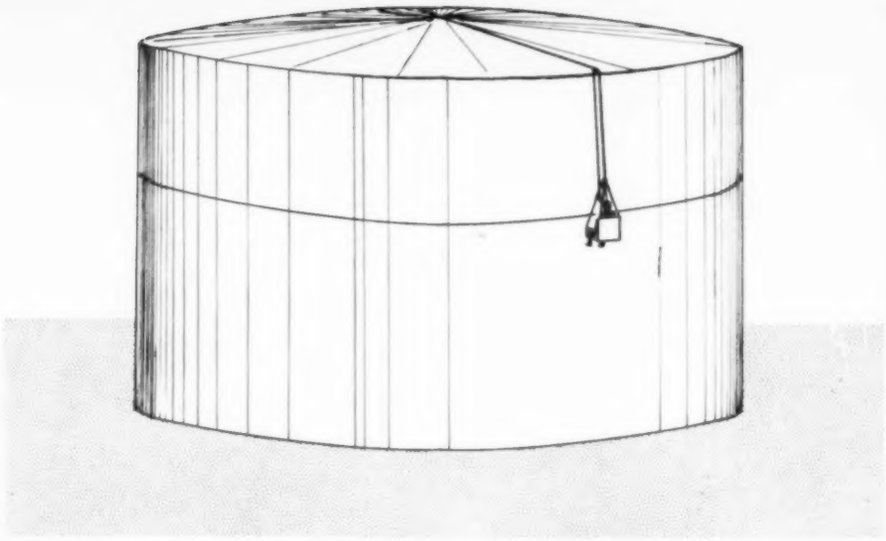
Most important, upkeep is low so you get maximum time on the job. There are few wearing parts and lubrication fittings are conveniently grouped and easy to get at. Dust shields protect the bearings of the track rollers from dirt and grit.

Your Bucyrus-Erie distributor will be glad to give you the complete details on the ¾-yd. 22-B dragshovel . . . and you'll be glad he did when you put it to work on your spreads.

291E56

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN



Hoist Chair Aids Tank Strapping Job

One major oil company has found that the use of a hoist chair, when strapping a large storage tank, has taken a lot of unnecessary danger out of the job. Further advantages for the usage of a "chair" would be (1) safety advantages over the "ladder" method and (2) position of "strapper" tends to give greater accuracy.

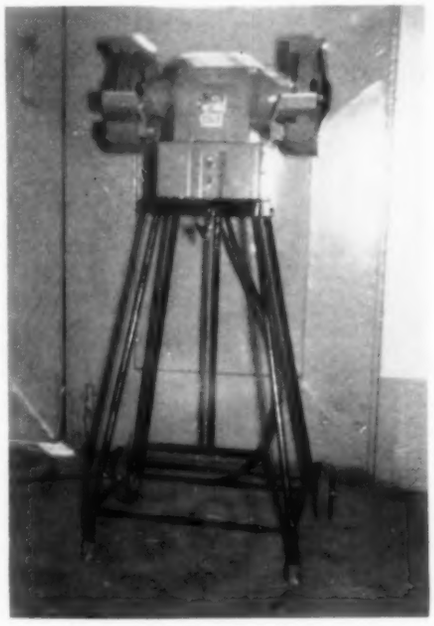
To put this to regular usage, the tank would have to offer the proper eyes or hooks to receive the lines from the hoist chair. However, the same hooks could be put to use on future painting jobs on the tank.

REPAIR LEAKS
QUICKLY—PERMANENTLY

SKINNER-SEAL PIPE JOINT CLAMPS stop leaks at joints. Put on under pressure—without interruption of service. Quick, simple, lasting repair. Sizes 1/2" to 24" incl. in stock.

SKINNER-SEAL COLLAR LEAK CLAMP—designed to stop every type of collar leak in oil and gas lines. Sizes: 2" to 13" inclusive.

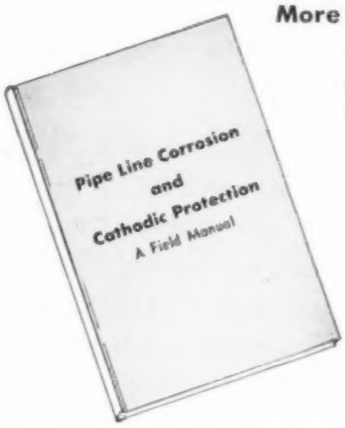
M. B. SKINNER COMPANY
SOUTH BEND 21, INDIANA, U. S. A.



Portable Stand Keeps Bench Grinder Accessible

This stand for a bench grinder can be made from scrap ¼-inch and ½-inch pipe with a 1¼-inch by 1¼-inch by ⅛-inch angle iron frame.

Two ⅜-inch holes are drilled in the angle iron to bolt down the bench grinder. The handle can be kept in a



More comments on this new Handbook:

". . . a most practical on-the-job manual for men concerned with pipe line corrosion. We are ordering copies for each of our district engineers."

Pipe Line Corrosion and Cathodic Protection

By MARSHALL E. PARKER

This Handbook, written by Marshall E. Parker, consultant, is designed as a practical field manual. It is a 108-page pocket-size volume printed first as a popular series in WORLD OIL. The Handbook is illustrated with many charts and drawings and is completely indexed by subjects.

It presents comprehensive data on Soil Resistivity Surveys, Potential Surveys, Line Currents, Current Requirements, Rectifier Systems, Ground Bed Design, Magnesium Anodes, Stray Current Electrolysis, Interference in Protective Systems, Operations and Maintenance, and Coating Protection and Testing.

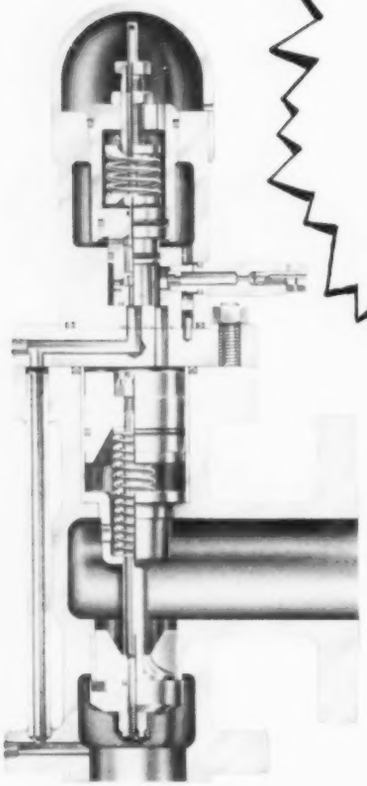
An appendix has been added of technical data on Underground Corrosion, Basic Principles of Cathodic Protection, Properties of Metals and Attenuation Equations. Order copies of this practical Field Manual now for each of your field men. Price $3.

Send for your FREE copy of the New Petroleum Book Catalog which describes the nature and contents of many books pertaining to the Petroleum Industry.

ADDRESS:

Book Department
GULF PUBLISHING COMPANY
P. O. BOX 2608
HOUSTON 1, TEXAS

INSTANTANEOUS OPENING FOR GAS OVERPRESSURES



MODEL 416 RELIEF VALVE ASSURES POSITIVE PROTECTION

The new pilot operated Kinzbach Model 416 Relief Valves were designed to be the most dependable relief valve for gas services. Whenever line pressure reaches set pressure the pilot valve opens and full line pressure is applied to the main valve, opening it through its full stroke without pressure accumulation.

This flat-seated pilot valve has a stainless steel loading spring which makes possible an extremely accurate set pressure and years of trouble-free performance. Some other advantages of this simple and rugged valve include its positive leakproof seating, easy functional testing below set pressure, and convenient bench setting for both opening and closing pressure. The Model 416 Valves are Certified under A.S.M.E. Unfired Pressure Vessel Codė (Sec. VIII, Par. UG-131).

For complete details on this and other Kinzbach Relief Valves, write for new catalog.

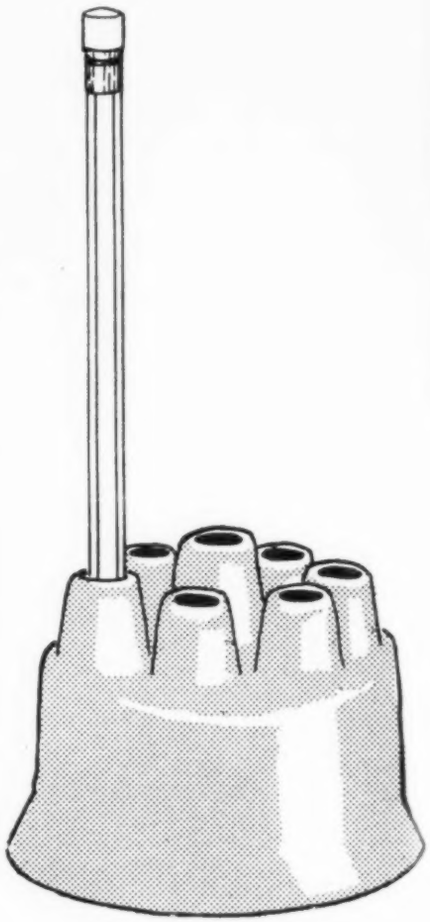
KINZBACH TOOL CO INC

KINZBACH TOOL CO., INC.
P. O. Box 277 • Houston, Texas

EXPORT OFFICE:
74 TRINITY PLACE
NEW YORK, N. Y.

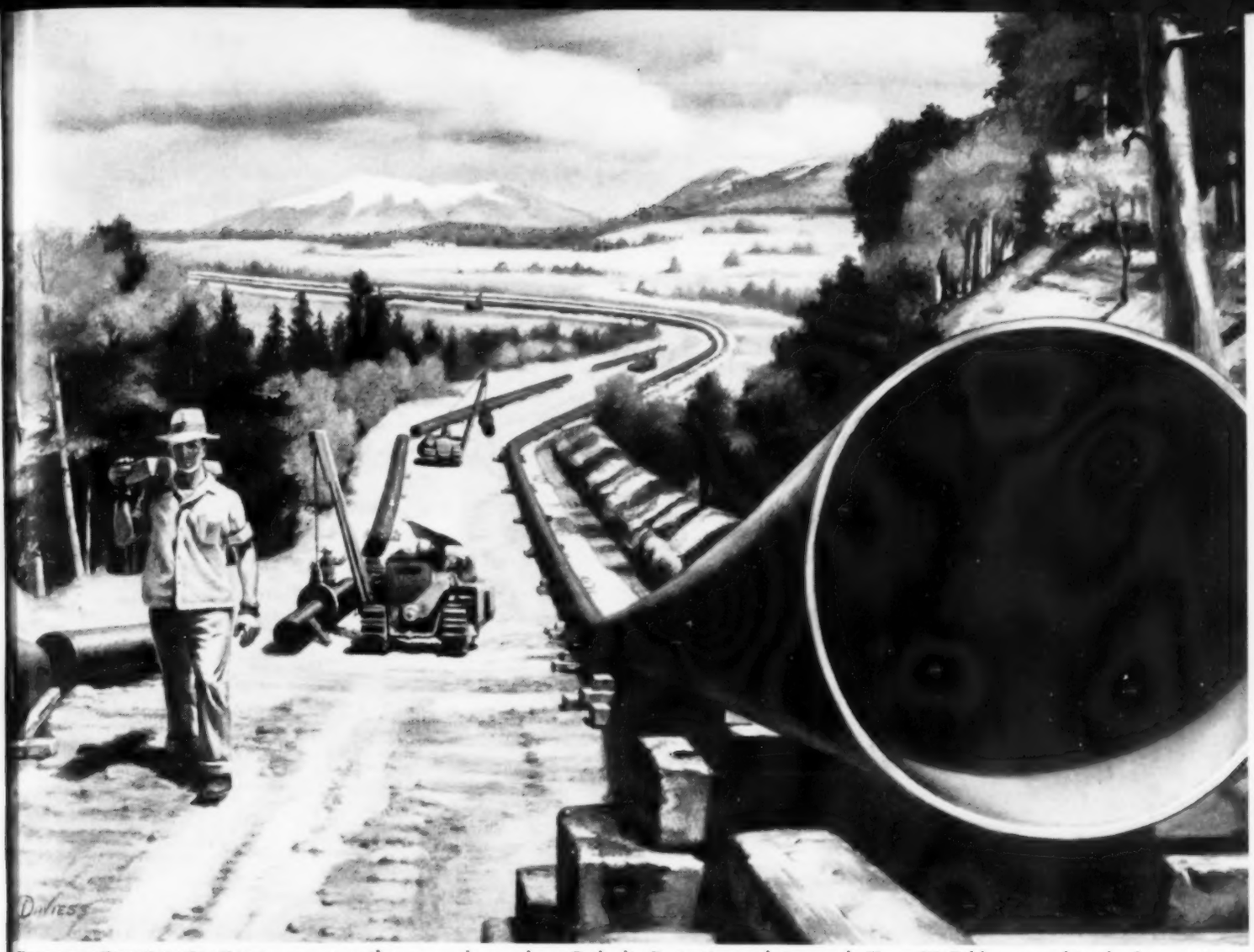
horizontal position by the catch shown, or released to hang vertically beneath the grinder when stationary location is desired. The handle is welded to a ½-inch rod, which pivots freely in two holes cut in the angle iron sides of the frame.

Two 6-inch by 1¼-inch rubber tired wheels are used on one side with rubber tips supporting the two legs on the opposite side. When not in use, the stand can be easily rolled to an out-of-the-way location and the handle lowered, making a compact semi-permanent location for the bench grinder.



Distributor Cap Makes Simple Pencil Holder

Use a discarded distributor cap to hold those pencils that often clutter up a shop table or desk. This simple, inexpensive holder keeps pencils handy when you need one, as well as improving appearance of the shop office.



Transcontinental pipelines are among the many places where Cathodic Protection and Anaconda Type CP Cable are used to check corrosion.

Cable that helps make the pipeline a good neighbor

To make cathodic protection systems more economical and effective – to help pipeline and oil companies check costly corrosion, stop leaks, make pipelines good neighbors – Anaconda offers a special Type CP Cable that *lasts far longer* on the job than ordinary cable.

High-grade plastic insulation offers high resistance to electroendosmosis†, as well as high resistance to oil, moisture, and most acids, alkalies and chemicals found in corrosive areas. And it withstands toughest abrasion, moisture and weathering.

To order, or for more information—call the Man from Anaconda.

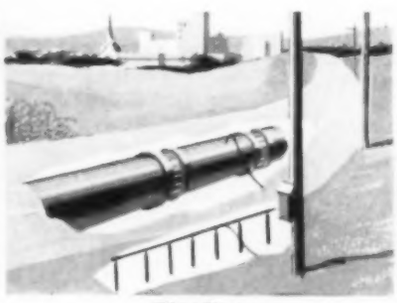
Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

†Cable failure on direct current in wet locations — 36257 Ref. (2)
®Reg. U. S. Pat. Office

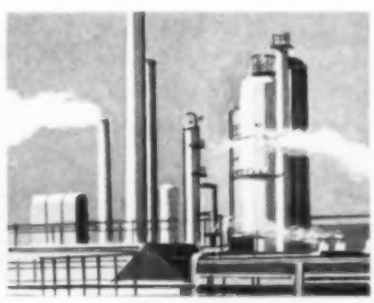
WHERE ANACONDA TYPE CP CABLE AND CATHODIC PROTECTION CUT CORROSION COSTS

Tank farms

Underground storage tanks



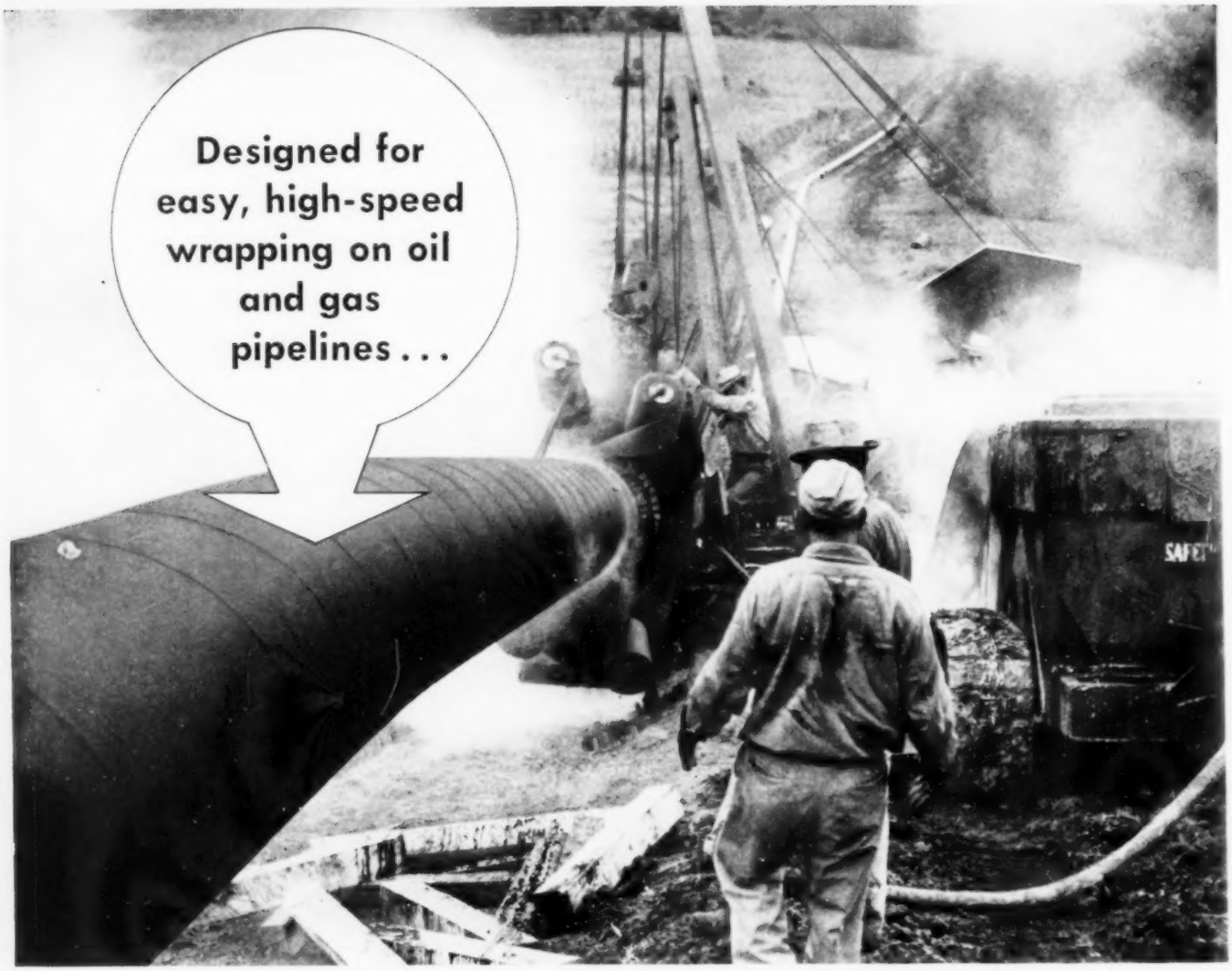
Pipelines



Oil refineries

ASK THE MAN FROM **ANACONDA**®

FOR **CATHODIC PROTECTION CABLE**



Johns-Manville TRANSHIELD® ASBESTOS PIPE LINE FELT

goes on fast, restricts soil stress, cuts maintenance

ON job after job, pipe line men have found that Transhield Asbestos Pipe Line Felt meets the need for an economical asbestos shield that is effective in average soil conditions.

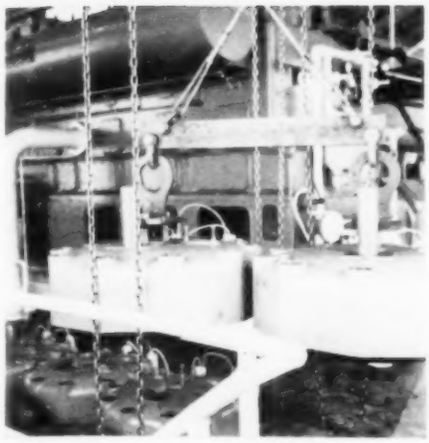
Contractors like Transhield because its special reinforcement makes it ideal for easy, high-speed application by modern machine methods. Consisting of a lightweight coal-tar-saturated asbestos felt, it is reinforced with continuous glass yarns parallel-spaced on ¼" centers. Transhield's light weight permits the use of 800-ft. rolls which increases application speeds since fewer stops for roll changes are required.

Transhield provides a continuous membrane between the pipe line enamel and the soil. It works effectively in preserving a continuous protective film of enamel on the pipe. During construction, it guards the enamel. After installation, it reduces the cold flow of the enamel, and acts as a surface barrier to restrict soil stress.

For further information write to Johns-Manville, Box 14, New York 16, N. Y.; in Canada, 565 Lakeshore Road East, Port Credit, Ontario.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville PRODUCTS FOR PIPE LINE PROTECTION



Cylinder Head Lifter Saves Time on Overhaul

On a six-cylinder engine, this cylinder-head lifter can save up to two man hours of hoisting time on each overhaul. A steel bar is supported by a cable sling from an overhead hoist. Two clevices hold the cylinder-head lifter rings.

As two studs are used to lift the head on each cylinder, it is necessary only to drop the lifter down on the cylinder-head and run nuts down part way on each stud.

With this "rig" two heads can be lifted at one time, and moved about for maintenance. This facilitates the removal and reinstallation with a minimum of labor.

Temporary Drum Rack Aids Storage of Oil on Job

This temporary rack is fabricated out of junk pipe and short pieces of scrap angle iron for transportation to new job sites or yards. In storing the variety of oils and fuels needed on a job, this rack is a convenient way to expedite the handling and emptying

QUALITY CONTROLLED in every step of manufacture . . .

LONE STAR
API LINE PIPE

From mining of raw materials through the finishing operations in Lone Star's ultra modern pipe mills . . Lone Star line pipe quality is controlled every step of the way.

Lone Star Steel is a completely integrated operation . . primarily dedicated to serving the teeming Mid-Continent area. Lone Star, however, furnishes hundreds of miles of line pipe for distant projects such as the great Pacific Northwest pipe line. Lone Star pipe bends readily, wall thickness is uniform, and long lengths and weldability speed up construction.

Neighbor, wherever you are, specify Lone Star and we both get a good deal.

Lone Star STEEL COMPANY

LSS

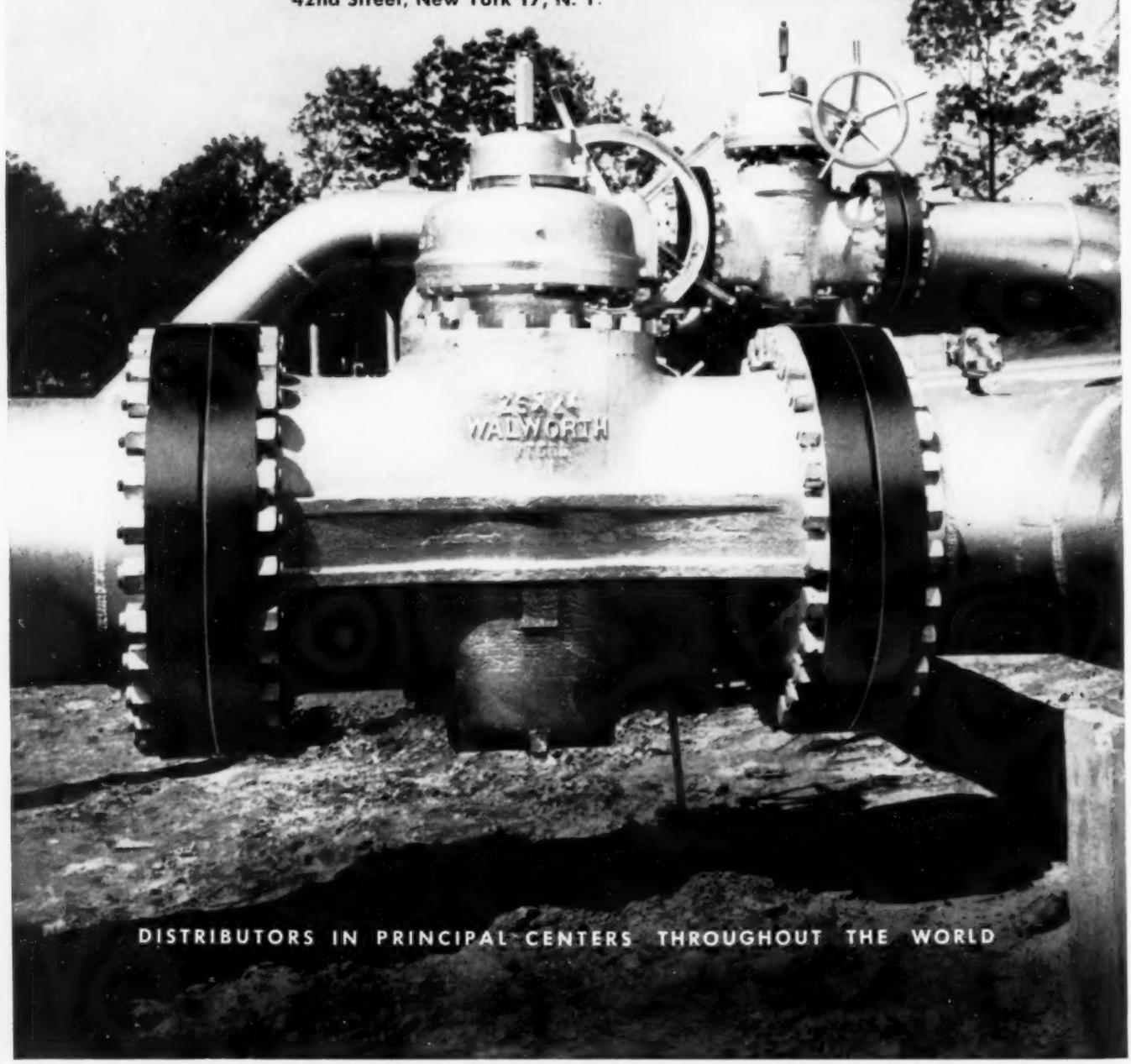
EXECUTIVE-SALES OFFICES
W. Mockingbird Lane at Roper • P. O. Box 12226 • Dallas, Texas

DISTRICT SALES OFFICES
Houston, Texas | Midland, Texas | San Antonio, Texas
Tulsa, Oklahoma | Wichita Falls, Texas | Shreveport, La.

LUBRICATED PLUG VALVES by WALWORTH

Two Walworth Cast Steel Lubricated Plug Valves in use on the main line of a southeastern gas pipeline.

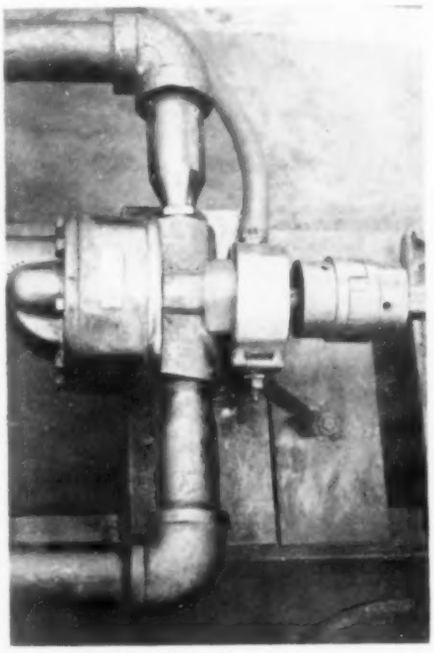
In addition to Lubricated Plug Valves, Walworth manufactures Gate, Globe, Angle, and Check Valves in a wide range of types and sizes for the oil and gas industries. Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

of the 55-gallon drums. To aid in loading drums on the rack, build a ramp on one end. This allows the drums to be rolled up and, with the platform slightly tilted toward the far end, gradually roll down to the assigned place.

To further segregate the drums as to product or usage, short pieces of angle iron the width of the rack can be cut and used as chocks. The angle iron chocks may be more permanently located by the use of pins dropped through holes in the angle iron into corresponding holes cut in the rack. The rack can be divided into as many sections as necessary, or have a separate "nest" for each drum.



Housing on Pump Frame Prevents Oil Spray

Bolt this simple housing to the pump frame, using two brackets made out of 1/16-inch steel plate. The top of the housing is hinged to provide access to the packing gland, allowing tightening when necessary. The pump packing gland is completely enclosed to control the fine spray that often results as oil leaks past the gland.

A drain tap may be installed in the bottom of the housing and a short piece of rubber hose may be attached to convey the wasted oil to the drain lines.

This simple feature eliminates the potential fire hazard of the fine oil spray striking a hot engine, and makes housekeeping easier.

STOPPLE APPLICATION
HOT TAPPING
PIGGING
BUSHINGS & INSULATORS

Agent for T. D. Williamson, Inc.

MARKER VENTS
AERIAL MARKERS
WELL MARKERS
SAFETY SIGNS

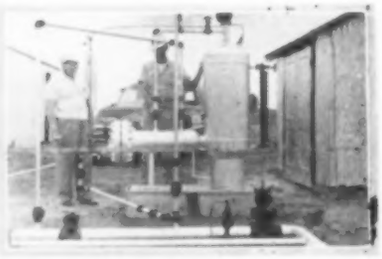
Sole Distributors for L & M Co.

ASPHALT OUTERWRAP
ASPHALT COATING
ROCK SHIELD

Agent for Gulf States Asphalt Co.

H & H GAS ODORIZERS
Built to your specifications

Manufactured by Tod Pazdral



GUILLOTINE SAWS
NATIONAL SAWS

Agent for E. H. Wachs Co.

MERCURY HYDRAULIC PIPE PUSHERS

Tell 'Em We'll Be There!

You can depend on Topaz sales engineers to be on the job--on time--working in cooperation with your engineering department. Topaz service includes furnishing all equipment on a lease, contract or purchase basis. Call Topaz day or night . . . we'll be there!

TOD PAZDRAL — **ToPaz**

PIPELINE SPECIALTIES

2525 South Boulevard • Houston 6, Texas
Day Phone JA 2-1403 • Night Phone MA 3-5680

For more data on advertised products, use Readers' Service Cards, last page.

Pipe Line Men

IN THE NEWS

Carl H. Gompf

J. H. Rice

Carl H. Gompf, manager of pipe lines for **Ohio Oil Company,** has retired after more than 46 years with the company. He was pipe line manager from 1953 until his retirement. Succeeding Gompf is **J. H. Rice,** assistant manager. **Ralph M. Slough,** manager of Pipe Line Electrical and Communications department, becomes assistant manager.

Ralph M. Slough

Rice joined Ohio Oil in 1930. Since 1942 he has served as assistant district superintendent at Yates; assistant superintendent of the Wyoming Pipe Line division; division superintendent, and assistant manager of the company's pipe lines. Slough joined Ohio Oil in 1922. He has held several positions with the company including supervisory positions in pipe line, construction and electrical work. He became superintendent of building construction in 1935 and manager of communications in 1938.

•

R. S. Cannon, chief electrical engineer, **Plantation Pipe Line Company,** Atlanta, Ga., has been named chairman of the Committee on Petroleum Industry of the American Institute of Electrical Engineers.

•

Texas Gas Corporation has announced the promotions of **R. T. (Tom) Neville,** formerly superintendent of the Winnie, Texas, plant, to general superintendent in charge of all plant operations. Neville became associated with Texas Gas in 1945 as plant foreman and became superintendent in 1954.

Charles C. Albritton, formerly superintendent of operations at the Winnie plant, has been promoted to assistant general superintendent. Albritton has been with Texas Gas since 1945.

•

L. G. (Gayle) Rodgers, general manager of the Gas division of **Sunray Mid-Continent Oil Company's** Production department, has been granted a year's leave of absence to serve with the Oil and Gas Division of the U. S. Department of the Interior in Washington, D. C.

•

Arthur J. Helmbrecht, vice president, was elected a director of **The Buckeye Pipe Line Company.** Helmbrecht joined Buckeye in 1935 as assistant to the chief engineer. He became chief engineer, assistant to the president and vice president.

•

John E. Chance, civil engineer with **Sun Oil Company,** has resigned his position to become a consulting civil engineer and surveyor in Lafayette, La. Chance specializes in engineering problems for the oil industry in south Louisiana.

•

A. E. Kihn, formerly manager of **Standard Oil of California's** Marine department, has been named president and director of **California Shipping Company,** new management organization in which Standard Oil has consolidated its marine activities. The firm will manage operations formerly handled by Standard's subsidiaries, California Transport Corporation and California Tanker Company and by the now dissolved Marine department. Shore personnel of the three companies will be transferred to California Shipping.

Other directors are **W. H. Beekhuis,** vice president, Standard of California; **H. A. Ervin,** vice president, California Tanker and California Transport; **L. C. Ford,** previously assistant manager, Marine department; **F. C. Loomis,** vice president, Western Operations, Inc.; and **B. W. Pickard,** president, The California Oil Company. Ervin and Ford will serve as vice president and general manager of the Atlantic and Pacific Divisions, respectively.

•

E. Russell Griffith, formerly employed by the American Gas Association, has joined **Texas Gas Transmission Corporation,** as a research engineer. Griffith will work on long-range planning problems concerned with growth of the Texas Gas system. During his time with the American Gas Association, Griffith was engaged in coordinating research programs related to natural gas production, transmission and underground storage. Earlier he was employed by Ford, Bacon and Davis, Inc. on natural gas deliverability studies, gasoline plants, natural gas and petroleum products pipe lines, chemical processes and related economic studies.

E. R. Griffith

•

R. L. Harris has joined **Northern Natural Gas Producing Company** as production engineer. He was associated with Sinclair Canadian Oil Company at Calgary as a petroleum engineer prior to joining Northern Natural Gas Producing Company.

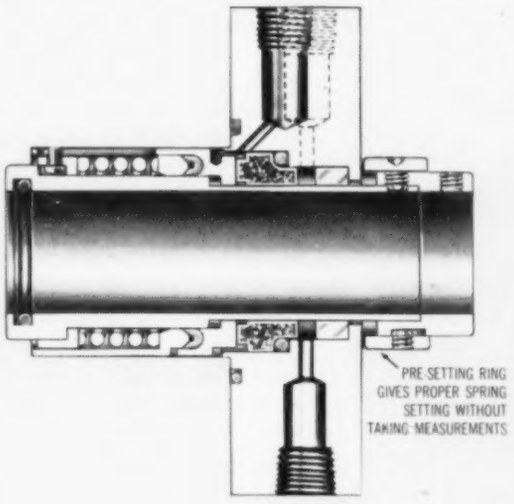
•

Ernest F. Semrad has been appointed assistant chief engineer of the **Michigan-Wisconsin Pipe Line Company** and of **American Louisiana Pipe Line Company.** Both firms are subsidiaries of American Natural Gas Company. **James J. Trebilcott** was named assistant manager of operations of Michigan-Wisconsin Pipe Line. Semrad joined Michigan-Wisconsin in 1949 after 15 years experience with other gas transmission companies. He had served as gas sales engineer and assistant engineer with Michigan-

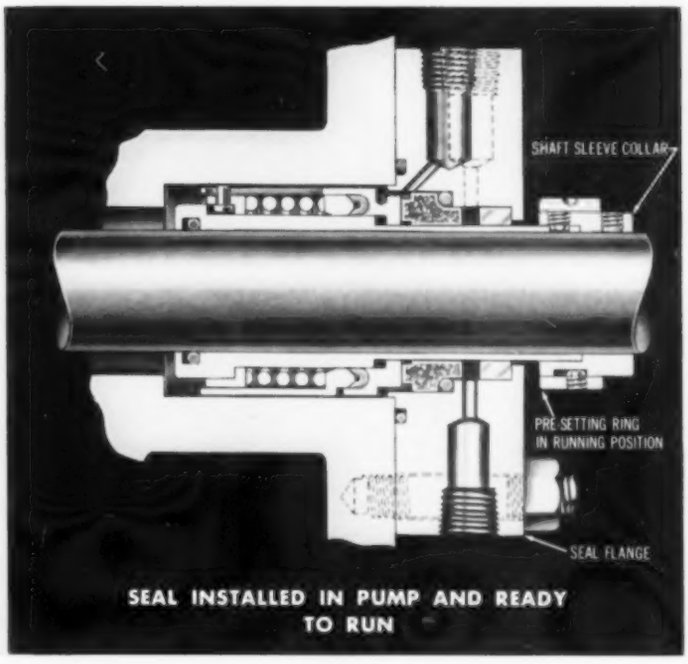
BIG SAVINGS FOR PIPE LINES!

New BJ Mechanical Seal

with automatic Pre-Setting Ring (Patent Pending) assures perfect installation ...without measurement



SEAL ASSEMBLED FOR INSTALLATION AS A CARTRIDGE UNIT



SEAL INSTALLED IN PUMP AND READY TO RUN

Perfect installation of BJ Mechanical Seals is now "built in" by this exclusive BJ Pre-Setting Ring. Anyone with a wrench and a screwdriver now can perfectly install or replace BJ Mechanical Seals. No measurements, no installation drawings, no field fitting required.

This new development provides a seal *assembled as a cartridge unit*—ready for installation. The BJ Pre-Setting Ring is attached to the shaft sleeve collar with a set screw in a slot of controlled length.

You simply slip the "packaged" seal on the shaft and into the stuffingbox... bolt the seal flange to the stuffingbox and the shaft sleeve collar to the shaft... then move the Pre-Setting Ring the length of the set screw slot and lock in place. Your seal is now in precise running position with the spring compressed to its proper tension.

Save time and labor on initial seal installation and on periodic pump inspections. *Specify BJ Mechanical Seals with exclusive Pre-Setting Ring.*

BJ

Byron Jackson Pumps, Inc.

A Subsidiary of Borg-Warner Corporation

P.O. Box 2017A, Terminal Annex, Los Angeles 54, California

For more data on advertised products, use Readers' Service Cards, last page.

Wisconsin prior to his current appointment. Trebilcott has been administrative assistant to the manager of operations of Michigan-Wisconsin since 1950. He worked for an Oklahoma utility prior to joining Michigan-Wisconsin in 1948.

•

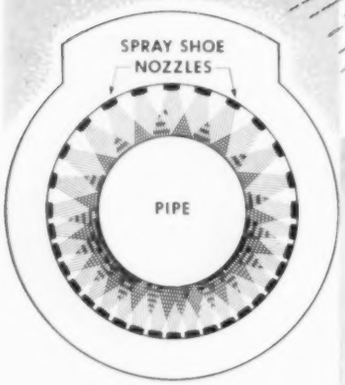
Rawlston D. Phillips, president of **General Gas Corporation,** has been elected chairman of the board of directors. Succeeding him as president and chief executive officer is his brother, **Hal S. Phillips.** Other elections include **Richard M. Mills** to the board of directors and **Arthur C. Rhyne** to the newly-created post of secretary-treasurer. Mills is vice president and general manager of General Gas's Eastern division in Macon, Ga. Rhyne is a director and former secretary of the company.

•

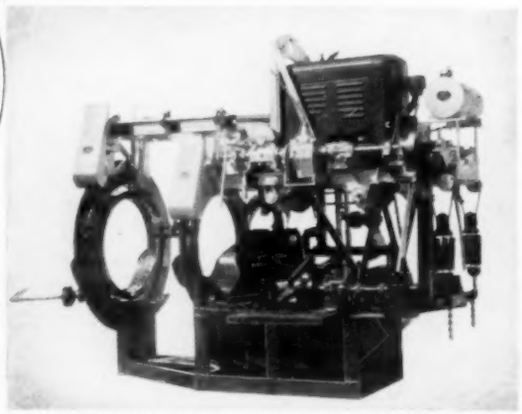
Cameron Parish Corporation has been merged with **Western Natural Gas Company.** Western's board of directors has been increased to nine members with the election of **Myron Ratcliffe** and **S. Gordon Glaysher** of Cameron Parish management. Glaysher also was elected a vice president.

A SPRAY SHOE Should SPRAY!

Perrault Coating & Wrapping Machines Have Exclusive NOZZLE-FITTED SPRAY SHOE



Spray shoe cross section shows how spray nozzles give DOUBLE dope coverage on pipe top, TRIPLE coverage on pipe bottom . . . Insurance for a better coating job.



DOUBLE-COAT, DOUBLE-WRAP MACHINE

PERRAULT COATING AND WRAPPING MACHINES for large pipe sizes are more dependable. They have less downtime because, when compared to the industry, they are designed with: More power, heavier transmissions, bigger clutches, stronger speed reducers, greater pumping capacity, full-width rubber crawlers. Even with these better components Perrault units are lighter in weight. Other models available for all pipe sizes; any coat and wrap combination. Call Perrault for complete details.

ALSO CARRIED IN STOCK:
Pneumatic Inside Line-up Clamps — sizes 20 to 36 in. Cleaning and Priming Machines — line traveling or stationary. Glass Pipe Wrap, Asbestos Felt Wrap, Kraft Wrap, and Rock Shield. Tar-Heating Kettles, Burners, Patch Pots and Accessories.
Pneumatic-Tired Lowering-In Cradles, Adjustable Pipe Cradles, Five-roller Cradles, Tongs, Hooks, Blocks, Belts, Slings, Line-up Clamps, Hand Tools, Supplies and Equipment of every sort.

PERRAULT EQUIPMENT COMPANY
1130 N. BOSTON — TULSA, OKLA. — TELEPHONE LUther 5-1103

C. L. Perkins

H. F. Steen

C. L. Perkins, vice president and general manager of **El Paso Natural Gas Company,** has been elected president of **El Paso Natural Gas Products Company**, a wholly-owned subsidiary of the firm. **Hugh F. Steen**, vice president and general superintendent of El Paso Natural Gas Company, has been promoted to manager of pipe line operations for the parent company. Perkins joined the El Paso Company in 1929 at the time of the first delivery of gas to El Paso. He started as field foreman, became field superintendent and later was promoted to vice president and general manager in El Paso. He will continue to serve as a vice president and director of the parent company.

Steen's promotion was made because of the expansion of the company's pipe line operations, making it necessary to separate the pipe line operations from other activities of the company. Steen joined El Paso Natural in 1930. For the past several years he has been vice president and general superintendent in El Paso. Steen will continue as a vice president and director of the company. The board of directors of El Paso Natural Gas Products was increased from six to seven members and **C. C. Cragin**, former officer and now a consultant to the El Paso Company, was elected the seventh member of the board. **Paul Kayser,** president of El Paso Natural Gas, was elected to the newly-created position of chairman of the board and chief executive officer of El Paso Natural Gas Products. In moving into the position as chairman of the board, Kayser resigned as president of the firm. He was succeeded by Perkins. **C. L. Moore**, who has been serving as vice president and general manager of the Products Company, will continue in that capacity.

•

Roy J. Tibbets, chairman of the board of directors of **Sinclair Pipe Line Company,** has retired after 42

Tuffy® Sling Bulletin

Reporting the Outstanding Performance of Union Wire Rope's Machine-Braided Wire Fabric Slings.

Streamlined Ferrules — Pressed On Over Tucked-In Splices — Give Tuffy Eyes Full Strength of Sling

It's on all Tuffy slings, and it doesn't cost you a penny extra. No sling ferrule like it anywhere! The ferrule is set on the eye splice under pressure so great that the eye splice has the full strength of the Famous Tuffy machine-braided wire fabric. It makes Tuffy slings stronger and safer. And still another advantage: because Tuffy slings are easier and safer to load, they're also faster to load. Yet Tuffy super-strong, super-flexible slings cost you no more than ordinary slings.

Hardly Ever Does a Kink Put a Tuffy on the Blink!

Try to kink a Tuffy sling — with all the force you can apply with two hands and the help of your feet. Chances are you'll need a vise. If you do succeed in putting a kink in that 9-part machine-braided wire fabric, you can straighten it out quickly and without materially damaging the fabric.

Tuffy Machine-Braided Wire Fabric — Successor to Wire Rope in Slings

Ordinary wire rope had the strength required for sling loads, but fell far short on the important qualities of flexibility, kink-resistance and ease of handling. Tuffy's patented 9-part machine-braided fabric combines super flexibility with extra toughness — costs no more than ordinary slings — and has uniformity of construction impossible to get in costly hand-braided slings.

Your Tuffy Distributor is Qualified to Help You Get More Service per Dollar from Slings and Hoist Lines

Send for FREE Tuffy Handbook of Slings and Fittings

For Canada, Safety Supply Co., Toronto

Distributors Fill Orders Fast on 16 Factory-Fitted Tuffys

Tuffy slings are factory-fitted, factory packaged and easy to order. They are delivered to you as a complete package — ready to go to work right now. Your distributor is ready to serve you, and he's backed up by his nearby Union Wire Rope depot.

No Complicated Specifications in Figuring and Ordering Your Tuffy Needs

Tuffys are tailored to special uses. Just select the Tuffy sling made for the type of load you're handling and (1) specify name — Tuffy; (2) specify type (U-1, U-2, etc.,); (3) specify diameter and length of fabric wanted. Special fittings are equally easy to order.

Tuffy Hoist Line Teams Up with Tuffy Slings

Tuffy Hoist Line is a special rope construction for hoisting on all types of over-head, stiff leg and mobile cranes, derricks and clamshells. Use it with Tuffy slings for a perfect working pair.

union Wire Rope **corp.**

2278 Manchester Avenue, Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

MY NAME_____ TITLE_____

COMPANY NAME_____

ADDRESS_____

2. CITY_____ ZONE____ STATE_____

years of service. Tibbets joined the Engineering department of Prairie Pipe Line Company in 1915. In 1929 he was made district foreman of the Western district with headquarters in Wichita. He continued in this capacity following the merger of the Sinclair and Prairie organizations in 1932 and was named assistant general superintendent in charge of the Northern Division Trunk Lines in 1936. Later Tibbets served as vice president of Sinclair Refining Company in charge of crude oil lines and became president and director of the newly-formed Sinclair Pipe Line Company in 1951. He has been chairman of the board and a director since 1953.

•

Texas Gas Transmission Corporation has assigned responsibility for the executive direction of the Operating departments to **A. L. Roberts,** vice president. As vice president in charge of operations, Roberts succeeds the late **L. E. Ingham,** who retired in February and died March 3. Roberts' responsibilities will include the company's Pipe Line Compressor, Dispatching and Measurements departments.

A. L. Roberts

Roberts was employed by Missouri-Kansas Pipeline Company, predecessor of Texas Gas, in 1940 as district superintendent at Bowling Green, Ky. Later he served in the same capacity with Kentucky Natural Gas Corporation, another Texas Gas predecessor.

When Kentucky Natural Gas Corporation and Memphis Natural Gas Company were merged into Texas Gas in 1948, supervision of construction of the company's new large diameter pipe line system from Texas and Louisiana to Ohio was assigned to Roberts. He was appointed general superintendent of the Texas Gas system in 1949 and elected vice president in 1956.

•

M. I. McGowan

L. E. Davis

L. E. Davis of Beaumont has been appointed general superintendent of operations and construction and **M. I. McGowan** of Houston has been named chief engineer of **Marine Gathering Company,** subsidiary of Commonwealth Oil Company of Houston.

Before joining Marine Gathering in 1954, Davis was with McCarthy Chemical Corporation and its successor, Texas Gas Corporation, as instrument supervisor at the Winnie, Texas, plant. Previously he was with Pure Oil Company for 13 years and Humble Oil & Refining Company for three years. McGowan, formerly assistant chief engineer for Mathieson Chemical Company, chief engineer for McCarthy Chemical and assistant chief engineer for Dow Chemical Company, came to Marine Gathering in 1956 from Tellepsen Petro-Chem Constructors.

•

Wyoming Nebraska Pipe Line Company has announced the appointment of **Robert A. Bainter**, former assistant superintendent, to the posi-

FOR BETTER TRENCHES
EITHER WAY YOU DIG THEM

You get the most ditch per dollar with Koehring and Parsons Heavy Duty Excavators. Trenches from 5 to 25 feet deep, up to 6 feet wide are within range of Koehring Hoes and Parsons Trenchliners distributed by Crutcher-Rolfs-Cummings, Inc.

In addition to top performance ditching, Koehring offers a variety of crawler and rubber-mounted excavators, among which are Cruiser Cranes and Hoes and Truck Cranes. Parsons offers both ladder and wheel-type Trenchliners, including C-R-C Middle and Big Incher Ditchers.

Free literature is available on the complete line of Koehring excavators as well as Parsons Trenchliners. Fill in coupon below, clip it and mail to C-R-C today, or for faster service call UNderwood 4-6391, Houston, Texas.

OTHER C-R-C EQUIPMENT

Cleaning and Priming Machines
Coating and Wrapping Machines
Vertical Pipe Benders
Stationary Machines
Line-Up Clamps
Kelley Rippers
Pipe Bevelers

FILL IN AND MAIL TO

PLEASE SEND LITERATURE ON KOEHRING ☐ PARSONS ☐

CRUTCHER • ROLFS • CUMMINGS, INC.
P. O. Box 2073 Houston, Texas

NAME_____ TITLE_____
COMPANY_____ DIV._____
STREET ADDRESS_____
CITY_____ STATE_____

Now! Enter against pressure safely... *at any time!*

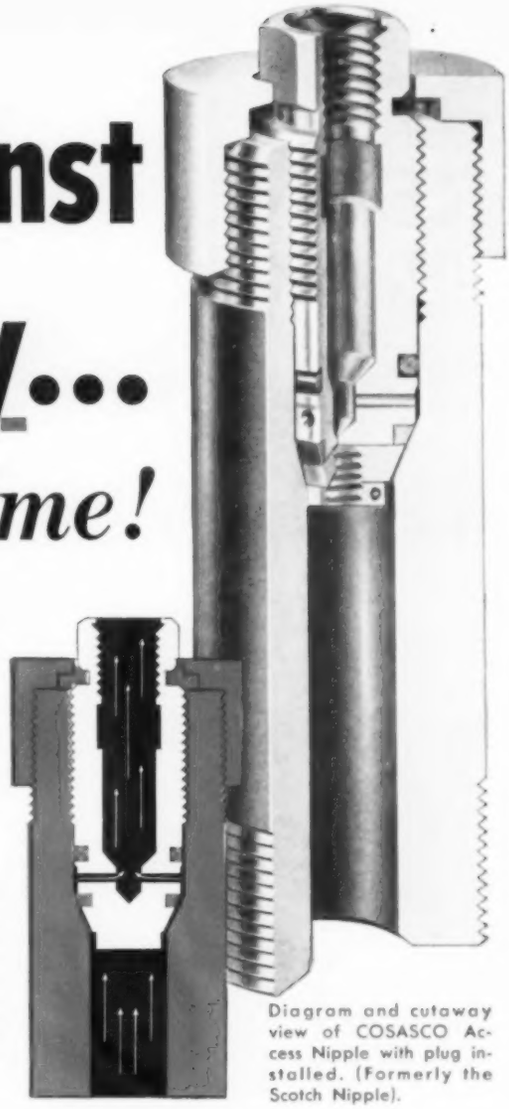


Diagram and cutaway view of COSASCO Access Nipple with plug installed. (Formerly the Scotch Nipple).

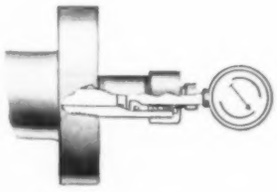
Wherever COSASCO Access Nipples are installed, you can go in against pressure with ease and perfect safety. At well heads, either the production string or annulus can be entered for instrument work. At refineries or along pipe lines, samplers, thermocouples, hydrogen probes, or coupons for corrosion studies can be inserted *without interfering with operations!* And expensive valves or other externals can be replaced or removed at will and without loss of pressure or product.

The COSASCO Access Nipple has a removable low carbon grade 303-304 stainless steel plug which, when turned down on the fine threads in the nipple outlet, effectively seals off the nipple at a tapered seat below. By-pass holes in the plug wall, between primary and secondary seals, provide communication through the plug to the exterior when the plug is backed out against a safety ring run down on the pipe threads on the nipple body.

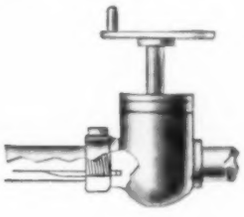
How entry is gained

With the COSASCO Retriever (Lubricator) and a full-opening valve mounted on the Access Nipple, COSASCO plugs, coupon holders or other units for inspection, testing, sampling, can be installed and removed at will regardless of pressure and without equipment shutdown. Details will be supplied promptly, on request.

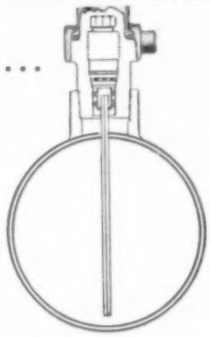
How **COSASCO** *Access* Nipples are used . . .



As a gauge valve, with plug installed. Gauge screws into end of plug.



As a valve re-installation nipple, with a thread and seat protector replacing the plug.



As a coupon holder for corrosion studies through taps in pipe lines and pressured vessels.

Protect equipment . . . Save product

What's your problem?

If it's an entry-against-pressure problem, COSASCO engineers invite you to submit details. Send blue prints and drawings to depict the problem, and the COSASCO solution will be supplied *without charge*. And you will be under no obligation whatever for this service.

COSASCO Access Nipples are applicable to any pressure or storage system, hydraulic or gaseous.

COSASCO

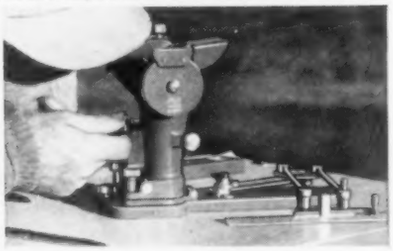
Division of Perfect Circle Corporation

3463 Ocean View Boulevard, Glendale 8, California

Address Mail to P.O. Box 277, LaCanada, California • Export Office: 617 S. Olive Street, Los Angeles 14, California

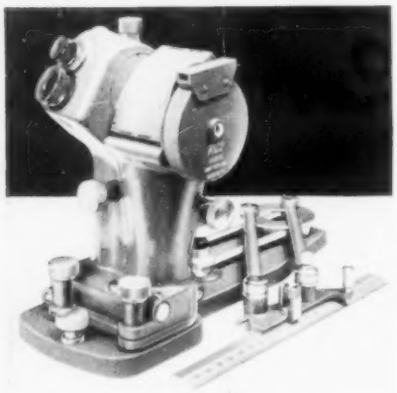
For today's competition . . .

TURN TO KERN INSTRUMENTS



For great savings of man-hours in the field. Highest precision results in shortest possible time.

DOUBLE YOUR PLOTTING SPEED



Reduce your plane table parties to two men (no recorder needed) . . . increase your accuracy with a

KERN RK SELF-REDUCING PLANE TABLE ALIDADE

- Unique precision parallel plotter.
- Eliminates slide rule, dividers, offset scale.
- New 27x telescope with fixed eyepiece and upright image, Kern AR coated optics.
- Stable plane table head built into tripod.

★

Write for Brochure RK 511-8

PROMPT, RELIABLE SERVICE
FACTORY TRAINED PERSONNEL

Kern And Only Kern Offers You the Latest Designs of Dr. Henry Wild

Kern SWISS *The FINEST in SURVEYING EQUIPMENT*

KERN INSTRUMENTS INC.
120 Grand St., White Plains, N. Y.

tion of superintendent of Wyoming and Nebraska. **Earl R. Ferguson** was named assistant pipe line superintendent and **Robert E. Fleenor** was named terminal supervisor at Sidney, Neb. Formerly Ferguson was Sidney terminal supervisor and Fleenor was terminal operator.

•

Southwest Gas Producing Company, Inc. has announced the appointment of **Fred H. Plitt** as staff engineer at the company's general office in Monroe, La. Before joining Southwest, Plitt was employed by Carter Oil Company at Seminole, Okla.

WHO'S MEETING WHERE

April

NACE, Central Oklahoma Section, and University of Oklahoma Corrosion Control Short Course, Univ. of Okla. Extension Study Center, Norman, April 2-4.

Petroleum Equipment Suppliers Association, Palm Springs, Calif., April 6-11, 1957.

Industrial Accident Prevention Association, Royal York Hotel, Toronto, Canada, April 8-9.

ASME, Spring Meeting, Hotel Dinkler-Tutwiler, Birmingham, Ala., April 8-10.

AGA Distribution, Motor Vehicles and Corrosion Conference, Rice Hotel, Houston, April 8-11.

American Welding Society, Sheraton & Bellevue Stratford Hotels, Philadelphia, April 8-12.

Institute of Radio Engineers, 1st Annual Conference on Electronics in Industry, Illinois Institute of Technology, Chicago, April 9-10.

Petroleum Industry Electrical Association & Petroleum Electric Supply Association, 29th Annual Conference and Exhibits, Shamrock-Hilton Hotel, Houston, April 16-18.

Southwestern Gas Measurement Short Course, College of Engineering, University of Oklahoma, Norman, April 16-18.

National Petroleum Association, 54th Annual Meeting, Cleveland Hotel, Cleveland, April 16-18.

National Gasoline Association of America, 36th Annual Convention, Rice Hotel, Houston, April 24-26.

Independent Petroleum Association of America, Midyear Meeting, Buena Vista Hotel, Biloxi, Miss., April 28-30.

Southern Gas Association, Annual Convention, New Orleans, April 29-May 1.

May

4th Annual Conference for Engineers & Architects, College of Engineering, Ohio State University, May 3.

API Annual Pipe Line Conference, Cleveland Hotel, Cleveland, May 6-8.

Fluid Control Institute, Greenbriar, White Sulphur Springs, W. Va., May 8-11.

AGA-PCGA Gas Supply, Transmission and Storage Conference, Mark Hopkins Hotel, San Francisco, May 8-10.

API Safety and Fire Protection Committees, Hotel President, Kansas City, Mo., May 13-17.

American Right-of-Way Association, 3rd Annual Seminar, Conrad Hilton Hotel, Chicago, May 16-17.

ASME, 29th Annual Conference and Exhibit of Oil and Gas Power Division, Kentucky Hotel, Louisville, Ky., May 20-23.

Southern Gas Association, Short Course on Gas Technology, Texas College of Arts & Sciences, Kingsville, Texas, May 29-31.

June

Petroleum Electric Power Association, Annual Conference, Amarillo, Herring Hotel, June 3-5.

Appalachian Underground Corrosion Short Course, West Virginia University, Morgantown, W. Va., June 4-6.

ASME, Semiannual Meeting, Sheraton-Palace Hotel, San Francisco, June 9-13.

ASTM, Chalfonte-Haddon Hall, Atlantic City, N. J., June 16-21.

Association for Computing Machinery, 12th Annual Meeting, Houston, June 19-21.

Canadian Gas Association, 50th Annual Meeting, Jasper Park Lodge, Ontario, June 23-27.

Michigan Gas Association, Grand Hotel, Mackinac Island, Mich., June 24-25.

American Institute of Electrical Engineers, Sheraton-Mt. Royal Hotel, Montreal, Canada, June 24-28.

September

National Petroleum Association, 55th Annual Meeting, Traymore Hotel, Atlantic City, N. Y., Sept. 11-13.

12th Annual Instrument-Automation Conference and Exhibit, Auditorium, Cleveland, Ohio, Sept. 11-15.

ASME, Fall Meeting, Mayo Hotel, Tulsa, Sept. 23-25.

October

Texas Mid-Continent Oil & Gas Association, 38th Annual Meeting, Texas Hotel, Fort Worth, Oct. 1-2.

NACE, North Central Region, Sherman Hotel, Chicago, Oct. 1-4.

NACE, South Central Region, City Auditorium, Oklahoma City, Oct. 1-4.

American Gas Association, Kiel Auditorium, St. Louis, Mo., Oct. 7-9.

AIEE, Morrison Hotel, Chicago, Oct. 7-11.

GAUGE HATCHES
Available for cone roof, floating roof and low pressurized storage tanks, featuring positive tightness, automatic closure, and resilient cover seal.

FREE VENTS
Sturdy, screened units that provide unimpeded free flow of air and vapor in and out of tanks.

BREATHER VENTS
For low pressure storage of both the working and emergency type, incorporating diaphragm seals for positive tightness.

ANNOUNCING Wheaton *precision* TANK FITTINGS

WATER DRAIN VALVES
New designs incorporate steel bodies, with resilient seats.

AUTOMATIC TANK GAUGES
Incorporate Neg'ator spring in gauge head with high visibility tape with new design tubular float. Applicable to all low pressure storage tanks.

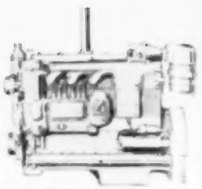
Precision is the hallmark of Wheaton Tank Fittings—developed through 65 years experience in the manufacture of equipment for the handling of petroleum and chemical products. Wheaton Precision is your assurance of quality. Send for Catalog No. 66, which illustrates and describes the complete line of Wheaton Tank Fittings.

WHEATON BRASS WORKS, UNION, N. J.
Manufacturers of Loading Arm Assemblies, Swing Joints, Loading Valves, Quick Couplings and Truck Tank Equipment
EMCO LIMITED, LONDON, CANADA
EMCO BRASS MFG. CO., LIMITED, WESTWOOD, MARGATE, KENT, ENGLAND
Manufacturing licensees in Germany, Sweden, France, Brazil, Australia

Tank Fittings by Wheaton
the best by every standard

MODERN HEAVY-DUTY CAT* DIESELS FOR THE PETROLEUM INDUSTRY

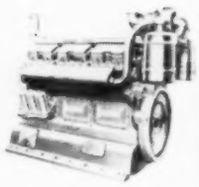
NEW D318 (Series G) Turbocharged **175 HP†**



Smaller, Lighter, Lower Priced!

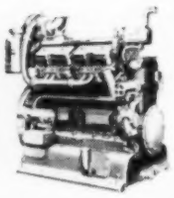
Keeping in line with Caterpillar continued diesel leadership ar these new Series G engines. The are designed for use in installation where space is at a premium. Bot are small, light and low-priced; ye they deliver dependable power wit the renowned Caterpillar dura bility. Both are available naturall aspirated (shown here) or turbo charged. Choice of air or electri starting system.

D397 with Turbocharger **650 HP†**



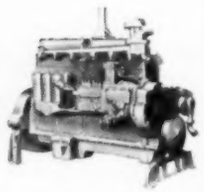
Also a Roots blown, naturally aspirated or spark-ignition engine; electric set or torque converter power unit. Air, electric or gasoline starting.

D375 with Turbocharger **430 HP†**



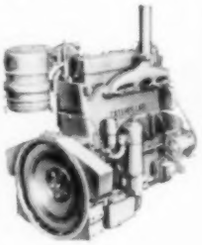
Also a Roots blown, naturally aspirated or spark-ignition engine; electric set or torque converter power unit. Air, electric or gasoline starting.

D342 Naturally Aspirated **210 HP†**

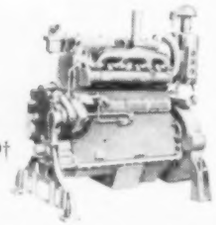


Also available as an electric set. Choice of air, electric or gasoline starting system.

NEW D315 (Series G) Turbocharged **115 HP†**

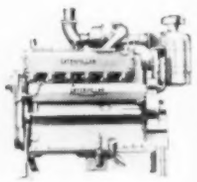


D339 Naturally Aspirated **140 HP†**



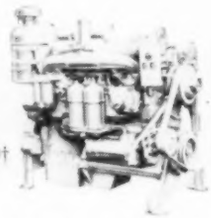
Choice of air, electric or gasoline starting system.

D337 with Turbocharger **310 HP†**

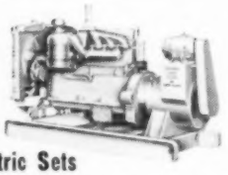


Also available as an electric set or torque converter power unit. Choice of air, electric or gasoline starting system.

D326 Naturally Aspirated **200 HP†**



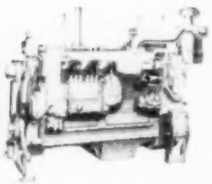
Also available as an electric set or torque converter power unit. Choice of air, electric or gasoline starting system.



Electric Sets

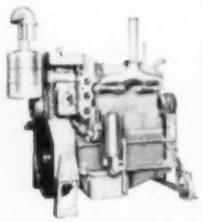
Dependable electric power, featuring the new Cat Generator, available in standard voltages, 60 cycle, in the following KW sizes: 30, 40, 60, 100, 150, 165, 200, 225, 250, 315, 350. Also available as 50-cycle and DC units.

D318 Naturally Aspirated **137 HP†**



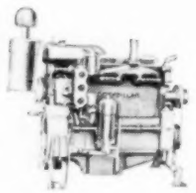
Also available as an electric set or torque converter power unit. Choice of air, electric or gasoline starting system.

D315 Naturally Aspirated **91 HP†**

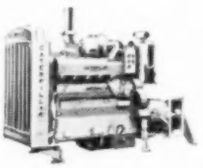


Also available as an electric set or torque converter power unit. Choice of air, electric or gasoline starting system.

D311 Naturally Aspirated **65 HP†**



Also available as an electric set. Choice of air, electric or gasoline starting system.



Torque Converter Power Units

Many different arrangements are available for each of six Cat Engines. Wide choice of power units and wide choice of output shafts.

†maximum output capacity

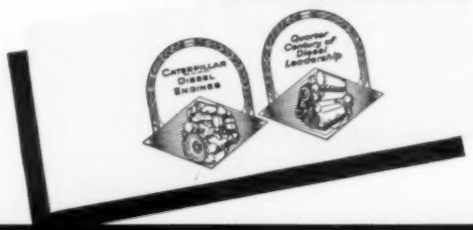
In its quarter century of diesel leadership, Caterpillar research has been responsible for advance after advance in the efficiency of these engines. The units you see here incorporate the latest diesel developments – a modern heavy-duty line that offers you hundreds of various packages to meet your requirements for work power or standby power. Whatever your original or replacement needs, you'll find exactly the unit you want in this line-up, with engines available up to 650 HP (maximum output capacity) and electric sets up to 350 KW (continuous duty). Leading equipment manufacturers can supply them in the machines they build.

For complete information about them, see your Caterpillar Dealer.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



What's Happening

AMONG SERVICE AND SUPPLY MEN

Sheehy Is Made Western Manager Of Tube Turns Plastics, Inc.

James L. Sheehy has been appointed district manager of the Western area recently established by Tube Turns Plastics, Inc. Sheehy will make his headquarters in San Francisco.

J. L. Sheehy

Sheehy joined Tube Turns Plastics, Inc. in May, 1956, after his merchandising efforts in another field came to the attention of a company official. He served successively with the Research and Development department and the field staff before his new assignment.

The company's Western area comprises California, Oregon, Washington, Wyoming, Montana, Utah, Arizona, Nevada and Idaho.

Tube Turns Plastics, Inc. is owned jointly by National Cylinder Gas Company, Chicago, and Jackson & Church Company, Saginaw, Mich.

Jones & Laughlin Announces Kansas Sales Appointments

Personnel changes in the Kansas district sales organization of Jones & Laughlin Supply Division have been announced. Duane C. Wixson, sales representative who has served at Hill City for 3½ years, has been assigned to the Russell area. Verlyn I. Ginther has been promoted from local store manager to sales representative at Hill City.

Wixson joined J & L Supply's store force at Chase in 1947 and served as storeman until 1953, when he was promoted to sales representative at Hill City.

Ginther has been associated with the firm's oil field supply store at Hill City since joining the company in 1952 as a storeman. He became local store manager in 1956.

Ross Heat Exchanger Names Six to Key Posts in Sales

Ross Heat Exchanger Division of American-Standard has announced six appointments to key posts in the recent expanded Sales department.

New appointments include Paul W. Wilcox, sales manager; George G. Van Tuyl, manager of power equipment sales, eastern region; Marvin F. Schobert, product manager, standard exchangers; Richard J. Riedl, product manager, engineering, navy and atomic exchangers; Lawrence M. Fletcher, product manager, feedwater heaters, and William G. Ritchie, product manager, surface condensers and ejectors.

Braendel, Lutz, Moffett Promoted with Wilkening

Recent promotions announced at Wilkening Manufacturing Company, Philadelphia, include H. G. Braendel, formerly director of engineering and production, to vice president—engineering; J. O. Lutz, assistant chief engineer, to chief engineer; and H. O. Moffett, production manager, to factory manager.

Buda Earth Drill Business Sold to Mobile Drilling

Mobile Drilling, Inc., has purchased the earth drill business of the Buda Division of Allis-Chalmers Manufacturing Company. Inventories are being moved to the Mobile drilling plant in Indianapolis. Dealers who have been selling earth drills will be able to secure parts and service from Mobile Drilling, Inc.

No other products of the Buda Division or of Allis-Chalmers Manufacturing Company are involved in the transaction.

This acquisition substantially increases the range of models and sizes of earth drilling equipment offered by Mobile, enabling them to sell into wider markets than previously reached with their own line of equipment.

Jensen Engineering Completes Move to New Location in Tulsa

Jensen Engineering Company of Tulsa has completed moving into its new building at 53rd and Garnett Road, according to A. C. Jensen, president. The new building houses both the company offices and manufacturing plant with expanded facilities for production of the company's line of tank mixers for the oil industry.

M. A. Phillips to Represent Warner Lewis in Eastern U. S.

The Warner Lewis Company, a division of Fram Corporation, announces the appointment of Milton A. Phillips as its representative for the eastern U. S.

M. A. Phillips

Phillips, prior to his new assignment, served as an assistant sales manager with the company in Tulsa. As eastern representative, he will supervise activities of the company representatives in Pennsylvania, New York and the Middle Atlantic and New England states.

Cleveland Trencher Names New Jersey Distributor

The Cleveland Trencher Co. has appointed E. H. Kliebenstein Co., 1099 Hendricks Causeway, Ridgefield, N. J., as distributors for the complete line of Cleveland trenchers, sidecranes, backfillers and tampers for northern New Jersey.

The distributor's territory includes the counties of Warren, Sussex, Morris, Union, Bergen, Hudson, Passaic, Essex, Hunterdon, Somerset, Middlesex and Monmouth.

E. H. (Red) Kliebenstein is president of the distributing firm. Sales officials include Clarence Hayward, Don McKeever and Gene Crummy. Ralph Mancione is service manager and Mike Halloran parts manager.

Carl E. Schmitz

B. H. Stenberg

Vance E. Vorhees

E. H. Stubenrauch

Crane Packing Company Makes Four Executive Promotions

Four executive promotions have been announced by Crane Packing Company. Promoted to new posts are Carl E. Schmitz to executive vice president from his former capacity as vice president—sales; Vance E. Vorhees, to vice president—sales from assistant general sales manager; B. H. Stenberg, to vice president—manufacturing from works manager; and E. H. Stubenrauch, to assistant general sales manager from divisional sales manager.

The company has completed an expansion program in the U. S. and Canada which included a new factory, laboratory facilities, and offices in the Chicago suburb of Morton Grove; new plants in Houston, Los Angeles and Hackensack, N. J., and expansion of the Canadian plant in Hamilton, Ont. New facilities have been purchased in central Illinois.

Dow Chemical Names Harco Magnesium Anode Distributor

The Dow Chemical Company has added another firm to its network of distributors of magnesium anodes for corrosion control.

The Harco Corporation of Cleveland is the eighth distributor chosen by Dow to handle sales and installation of magnesium cathodic protection systems.

Harco, an engineering service firm, will assume anode distribution in the North Central territory. The Ohio company also supplies rust prevention systems, plastic and other protective coatings, and carbon and zinc anodes.

Other Dow anode distributors are Electro Rust-Proofing Corp., Bellville, N. J.; Stewart Steel Protection Company, Plainfield, N. J.; Royston Laboratories, Inc., Pittsburgh, Pa.; Corrosion Services, Inc., Tulsa; Cathodic Protection Service, Houston; The Vannode Co., Pasadena, Calif., and Ets-Hokin & Galvan Co., San Francisco.

Tracerlab Names DeHaan Director of Western Division

Abel DeHaan, Jr.

Abel DeHaan, Jr., has been promoted to director of Tracerlab's Western division, Richmond, Calif. He will be responsible for the efforts of some 100 engineers, scientists and technicians in Tracerlab's new enlarged research and manufacturing facilities on the West Coast, including supervision of engineering, technical and other operations.

DeHaan joined Tracerlab in 1948 as a radiochemist and has been employed at Tracerlab's Western division since that time, advancing to the position of director.

New Houston Firm to Make Cathodic Protection Rectifiers

A new Houston company, recently incorporated under the name Electronics International, Inc., will design, manufacture and market rectifiers for protection by impressed current of buried and submerged metal structures.

Wayne A. Johnson is president of the firm. Other executives are Ted Riseling, vice president in charge of sales, who has more than 20 years experience in the manufacture of rectifiers and related equipment; and J. H. Reynolds, vice president and secretary.

Manufacturing facilities are being set up at the location of the sister company, Corrosion Rectifying, Inc., of which Johnson is also president.

Leslie Dickson

Ralph Pass

Cathodic Protection Announces Three Staff Appointments

Ted Canfield

Cathodic Protection Service has announced the addition to its staff of three corrosion engineers to represent the company in Tulsa, New Orleans and Houston.

Ted L. Canfield, now in the Tulsa office, formerly was head of the Corrosion Engineering department for Consolidated Gas Utilities Corporation. Ralph B. Pass, formerly with Southern Natural Gas, is assigned to the New Orleans branch office for Cathodic Protection Service. New appointment in the Houston office is Leslie L. Dickson, who was with Public Service Company of Colorado in the Gas Engineering department for six years.

Brand to Be Vice President Of Crose-Curran in Canada

J. W. Brand

J. W. Brand has been appointed vice president of Crose-Curran Ltd. in Edmonton, Alberta, Canada. Crose-Curran Ltd. is distributor for M. J. Crose Manufacturing Company, Inc.

Curran will be in charge of the Canadian operation with headquarters in Edmonton, Alberta, and a branch warehouse in Winnipeg, Manitoba.

Brand joined the Crose company in 1953 as a sales engineer. Previously he had been a field representative for Williams Brothers Co. and also was general manager of Brand Dispatching Company in New Orleans.

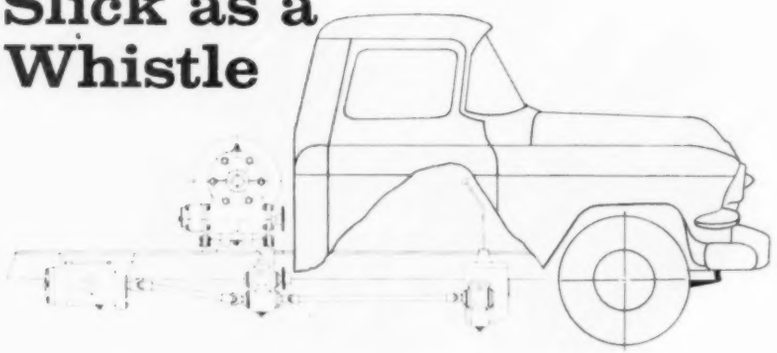
Napko Corporation Names Three Vice Presidents

Napko Corporation, Houston, has named three departmental heads to posts as vice presidents.

Walter H. Duve, production superintendent, is vice president in charge of production. Duve, who has been with Napko 30 years, has served in almost every phase of

BRADEN TRUCK WINCHES

Slick as a Whistle



Pictured here is just one of the many variations of a BRADEN back-of-cab winch installation. Every part is designed to fit in its place with the minimum of effort.

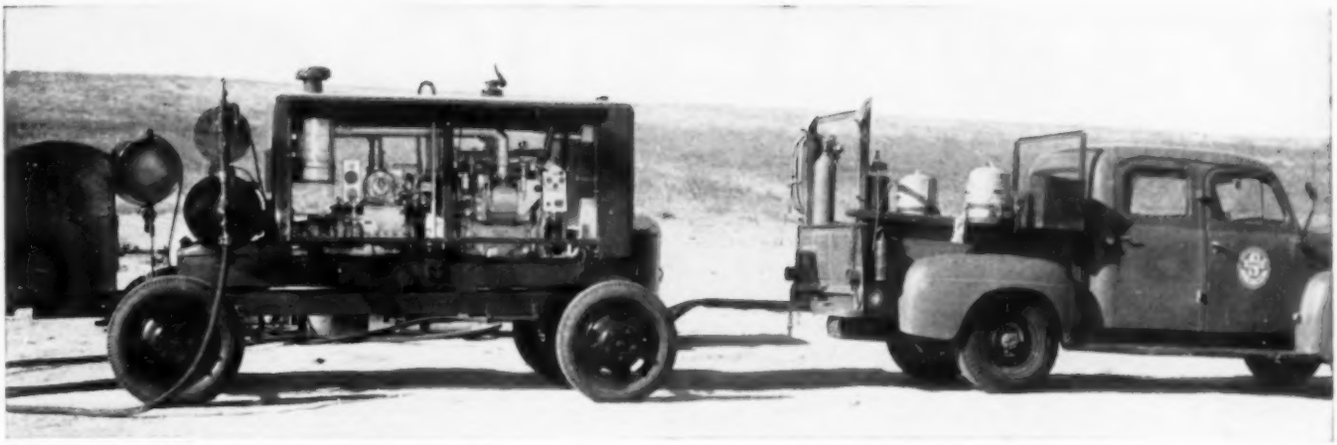
There is a BRADEN Winch to fit *every* make and model of truck. And BRADEN models are designed for both back-of-cab and front mounting. Capacities range from 6,000 to 100,000 pounds. Specify BRADEN Winches . . . and be sure!

WRITE FOR CATALOG

BRADEN WINCH COMPANY
P. O. Box 547, Broken Arrow, Oklahoma

BRADEN Winches

In service around the world



Complete mobile service unit used for sandblast cleaning of tanks and pipe, and also for line testing. The specially equipped air compressor is a Jaeger Roto Air Plus "365". Owned by Service Pipe Line Company, Lubbock, Texas.

Jaeger "365" rotary is a pipeliner's tool

FIRST FULLY EFFICIENT "600": Jaeger "600" Rotary weighs 4000 lbs. less than old-type reciprocating compressors, delivers 600 cfm @ 100 psi at only 1650 rpm. Other rotaries using same engine require 1750 to 1800 rpm.

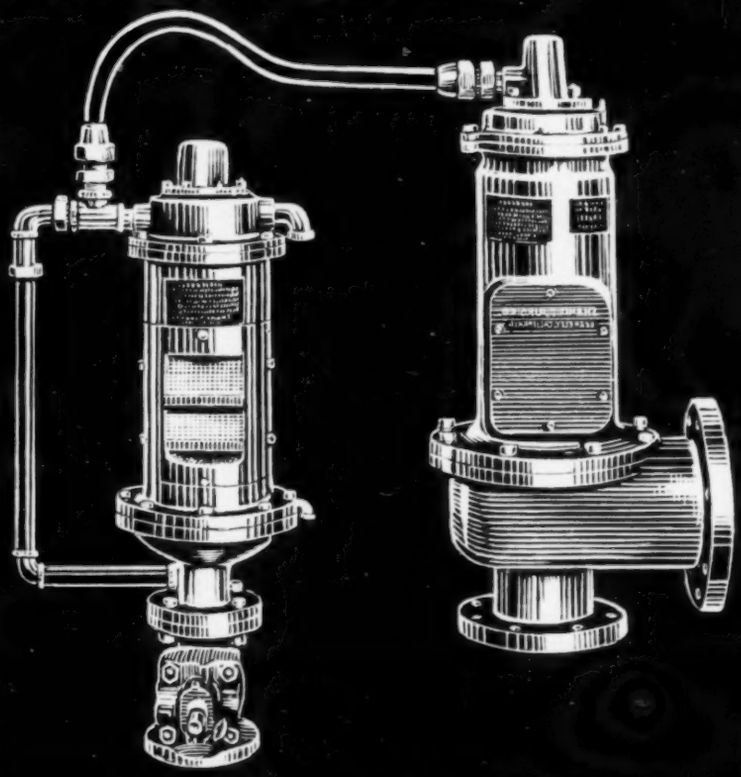
Gives you 50 cfm more air for sandblasting, while operating at 100 rpm slower speed

Jaeger, who originated the 600 cfm compressor when all others were still building 500 cfm machines, is first to offer you a 365 cfm rotary in place of the undersized 315 cfm "old standard" size. With more reserve power, from its GM 4-71 diesel engine, it operates at 100 rpm slower speed than any 315 (1700 rpm instead of 1800) yet delivers 50 cfm more air.

For heavy duty sandblasting, with 3/8" nozzle, the Jaeger "365" does a job no "315" unit can do. And it can operate a 4" heavy duty wagon drill plus a hand-held rock drill, which is beyond the capacity of a "315". For full information, check with your Jaeger distributor or write us for Catalog JCR 5.

THE JAEGER MACHINE COMPANY
665 Dublin Avenue, Columbus 16, Ohio
DEWATERING AND PRESSURE PUMPS • CONCRETE MIXERS

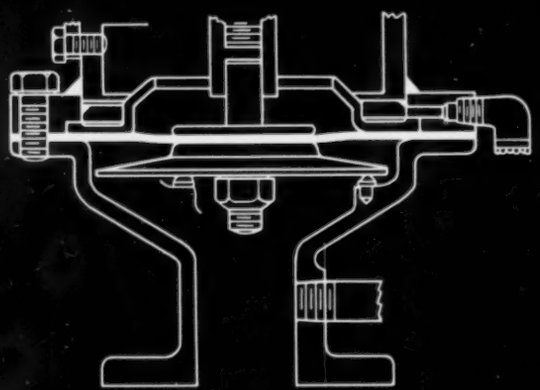
★ maximum safety
for pressure vessels



Protecting pressure storage vessels against the hazards incident to tank rupture due to excessive internal pressures is the purpose of S. & J. Pilot Operated Relief Valves, which are made in two models. The Model ST-5000 is applicable to vessels operating at pressures ranging from 1 to 15 pounds; and Model ST-2500 applicable to vessels with pressure ranges exceeding 15 pounds.

These pressure relief valves have Safety Features not found in other types of venting equipment—they are FRICTIONLESS in operation, with no bearings or sliding guides. No lubrication is required. They have considerable reserve force, and they operate at the exact pressures at which set, giving high venting capacity for their sizes.

The most important consideration is a patented safety feature* built into the pilot valve. Since there is always a remote possibility that the diaphragm in such a valve may rupture from fatigue, the piston of the pilot valve is so proportioned that tank pressure operating against it will cause the valve to open at a pressure below the regular setting.



* PATENTED SAFETY FEATURE
The effective area of the piston being greater than that of the diaphragm would cause the valve to vent at less than the "set" pressure, even if the diaphragm were entirely removed.

S&J

SHAND AND JURS CO.

A SUBSIDIARY OF CPC

BERKELEY 10, CALIFORNIA

NEW YORK
110 E. 42nd St.

HOUSTON
M. & M. Bldg.

TULSA
Thompson Bldg.

CHICAGO
10409 S. Western Ave.

LOS ANGELES
6399 Wilshire Blvd.

REPRESENTATIVES:
SEATTLE: Nebar Supply Company, 3000 Western Avenue
MONTREAL: Lytle Engineering Specialties, Ltd., 360 Notre Dame St., W.
TORONTO: Lytle Engineering Specialties, Ltd., 69 Eglinton East
VANCOUVER: P. D. McLaren & Son, Ltd., 3277 Main Street
CALGARY: P. D. McLaren & Son, Ltd., 510 - 9th Ave. W.
MEXICO, D.F.: Dalmo Comercial, S. A.
CARACAS: Sinclair Spence, C.A., Edificio Galipan
ENGLAND: Whessoe, Ltd., Sales: 25 Victoria St., London S. W. 1
Whessoe, Ltd., Works: Darlington, County Durham

the company's operation from paint formulator to construction engineer.

Sidney V. Smith is vice president in charge of trade sales, retail stores and merchandising. Smith has been associated with Napko six years. He started with Napko as a sales engineer and as preparation for his recent promotion has been serving the company in a sales management position.

Joseph E. Rench, newly-appointed vice president of industrial sales, research and product development, has won recognition for his research ability and knowledge of coating problems. Formerly he was technical director of Napko.

John R. Hemion

Russel A. Schlegel

Weston Appoints R. A. Schlegel General Sales Manager

Weston Electrical Instrument Corporation has announced the appointment of Russel A. Schlegel as general sales manager and John R. Hemion as assistant to the general sales manager.

Schlegel will supervise and coordinate all product sales and field sales activities for the company. Prior to his appointment, he was sales manager of the Industrial Sales Division. Schlegel has had more than 20 years experience in the instrument field, handling the sale and application of industrial instruments and components to all major industries.

Hemion transfers from Weston's New Jersey district sales office, which he managed for many years. He has been with Weston for more than 30 years.

Eckhardt Named Manager Of Union Switch & Signal

Paul K. Eckhardt has been appointed manager, General Apparatus Sales department, of Union Switch & Signal—Division of Westinghouse Air Brake Company.

Paul K. Eckhardt

Eckhardt has held several supervisory positions with Union Switch & Signal, the latest being section engineer, Traffic Engineering Section.

Eckhardt was in charge of organizing and conducting research and study activities for Union Switch & Signal on accident causation on the Pennsylvania Turnpike, for which the company received national recognition in 1953 and 1954.

Recently Eckhardt has directed development of remote control systems to control the movement of petroleum products through pipe line networks and pumping stations.

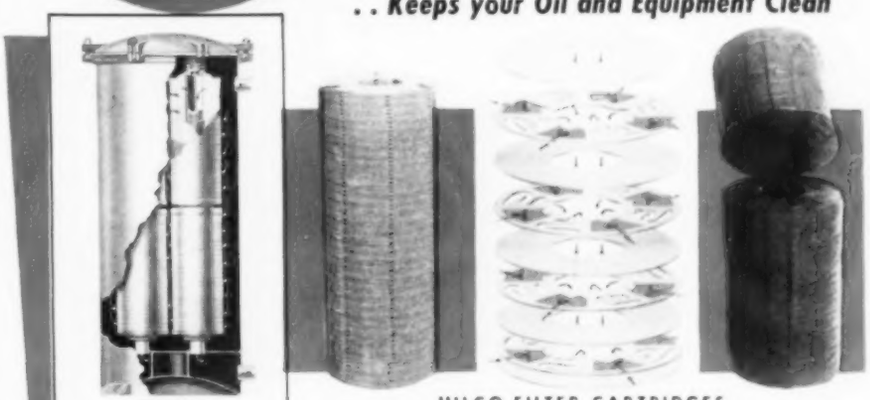
Clean Oil

SAVES YOU MONEY!

HILCO

OIL MAINTENANCE EQUIPMENT

.. Keeps your Oil and Equipment Clean



FILTER

Furnished in capacities from 0.1 to 750 gpm. Various cartridges available for mineral and inhibited detergent oils.

HILCO FILTER CARTRIDGES

The result of much research in the field of lubricating, fuel and industrial oil filtration, the new patented HILCO Filter Cartridges meet the need for tremendous filtering area, low pressure drop and high dirt storage capacity. Above: Fig. 1 is a new cartridge; Fig. 2 is a used cartridge (note that pockets are completely filled and the outer surface covered with solids); Fig. 3 shows the flow of oil, the dark area represents dirty oil passing into the pockets while filtered oil (white area) passes into "S" shaped section.

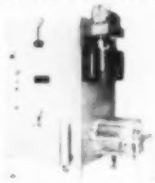
HILCO Purification Means *Complete* Oil Purification . . .

You get absolute removal of sludge, acids, carbon, water and fuel dilution with a properly selected HILCO. Clean oil saves you money. Expensive maintenance is reduced, equipment shut-downs practically eliminated, lost man hours and cuts in production become a thing of the past. HILCO continuous, all electric, automatic purification keeps your oil clean and in top condition at all times. You receive the full capacity and economy of your equipment.

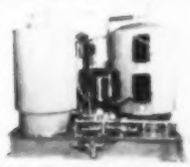
HILCO offers a wide range of oil purification units to meet every oil conditioning problem. HILCO units are manufactured in both stationary and portable models. Write us about your purification needs . . . recommendations are given with no obligation. Let HILCO put its 25 years of experience in oil purification to work for you.

THERE'S A HILCO FOR EVERY LUBRICATION AND FUEL OIL FILTERING PROBLEM

Oil Reclaimer



Purifier Re-Refiner



High Capacity Reclaimer

WRITE TODAY FOR THE NEW HILCO CATALOG

• Recommendations at no obligation!!

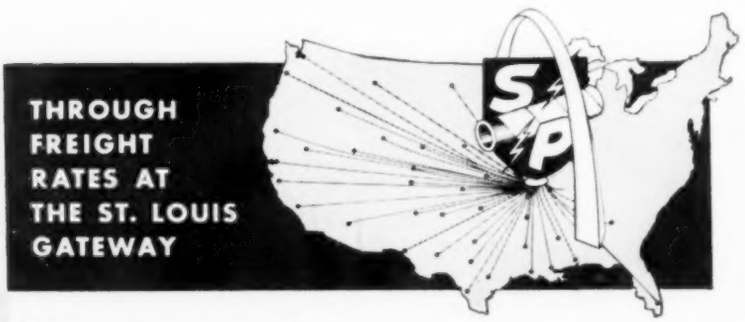
THE HILLIARD Corporation

64 W. FOURTH ST. • ELMIRA, NEW YORK

IN CANADA: Upton-Bradeen-James Ltd., 890 Yonge St., Toronto; 3464 Park Ave., Montreal

Everyone at Standard Pipeprotection is skillfully trained for his individual job. And everyone, from president to office boy, is also trained that it is his job to complete your order exactly as you have requested with shipment being made where you want it, when you want it.

As your pipe moves through our plant, your instructions are explicitly followed, for SPI believes that there is no substitute for customer satisfaction.



standard pipeprotection inc.

3000 SOUTH BRENTWOOD BLVD. • ST. LOUIS 17, MISSOURI

S. H. Reed

G. B. Wright

Nordberg Manufacturing Promotes Reed, Wright and Fellows

Nordberg Manufacturing Company has announced recent personnel appointment of Stephen H. Reed as sales engineer, and H. E. (Bud) Fellows as manager of the Power Chief Engine department and G. B. (Burke) Wright as district manager of the company's Great Lakes territory.

H. E. Fellows

Reed will make his headquarters in Houston and will work under the direction of Wayne Slife, district manager of Nordberg's Houston sales office. Reed will place special emphasis on engine applications for gas and oil pipe line pumping stations and marine installations. Formerly he was associated with Enterprise Engine and Machinery Company in San Francisco and recently served as district manager of their Tulsa office.

Wright has headed the Power Chief Engine department since 1950. As district manager of the Great Lakes territory, he will concentrate on sale of heavy duty Nordberg two-cycle and four-cycle engines for stationary and marine applications.

Fellows joined Nordberg in 1950 and formerly was manager for the Gasoline Marine Engine department. He headed this department for the past three years and previously was assistant sales manager of the department. Wes E. Park and Phillip R. Coerper will continue as sales engineers with the Power Chief Diesel and Gas Engine department.

Hammond Iron Works Appoints Kramer Executive Vice President

Ralph E. Kramer has been appointed executive vice president in charge of general operations and sales for Hammond Iron Work Company.

Kramer, vice president in charge of sales for Hammond for 12 years, was, for many years before his association with Hammond, engaged in manufacturing and marketing heavy machinery and tools for the oil, mining and construction industries in the U. S. and foreign countries. Kramer will spend his time between Warren, Penn., New York, and various plant offices of the company.

Ralph E. Kramer

H. D. Boggs

Jerry Hutchison

Continental-Emsco Company To Distribute for Fibercast

The Fibercast Corporation, subsidiary of The Youngstown Sheet and Tube Company, has announced the appointment of Continental-Emsco Company as oil field distributors of its Fibercast line pipe and well tubing.

The firm also announced expansion of the plant at Sand Springs, Okla., to increase production of line pipe and well tubing. H. D. Boggs is general manager of Fibercast with Jerry Hutchison as sales manager.

Rockwell Names Herbert Parker Atlanta District Sales Head

Herbert Parker, sales engineer in the Atlanta, Ga., district office of Rockwell Manufacturing Company's Meter and Valve division since 1950, has been promoted to Atlanta district manager.

Herbert Parker

Parker joined Rockwell in 1937 in the Houston district office. He became a sales engineer in the Houston area in 1940 and later served as a sales engineer attached to the Tulsa district office.

L.O.F. Glass Fibers Assigns New Field Representative

J. Walter Whitacre, Jr., has been assigned to the southeastern region as field representative for L.O.F. Glass Fibers Company, reporting to Ralph G. Cox, sales manager of the southeastern region. His headquarters will be at the company's Jacksonville, Fla., office.

J. W. Whitacre, Jr.

Before joining L.O.F. Glass Fibers, Whitacre was a salesman with R. W. Nichols Company, Cleveland, and was owner of Fort Meigs Machinery Company, Toledo. Previously he was associated with Tri-State Products Company, Toledo; Toledo Scale Company; Bowser Pump Company, Fort Wayne, Ind.; and International Harvester Company, Fort Wayne.

J. R. Robinson Named Manager Of Middle West Coating & Supply

Joe R. Robinson has been appointed manager of Middle West Coating & Supply with offices in Tulsa. Middle West is a distributor of pipe line protection equipment.

Joe R. Robinson

Robinson was with the pipe line engineering and personnel departments of Panhandle Eastern Pipe Line Company, Kansas City, and was Chicago area sales representative for Pittsburgh Coke & Chemical Company before he joined Middle West.

Dennis Joins Manufacturing Division of L.O.F. Glass Fibers

James A. Dennis has been appointed to the Manufacturing division of the L. O. F. Glass Fibers Company on special assignments under the supervision of J. H. Plummer, vice president of manufacturing and engineering.

James A. Dennis

For the past six months, Dennis has been undergoing a management trainee program with the company. Prior to that he was with Owens-Illinois Glass Company as an accountant.

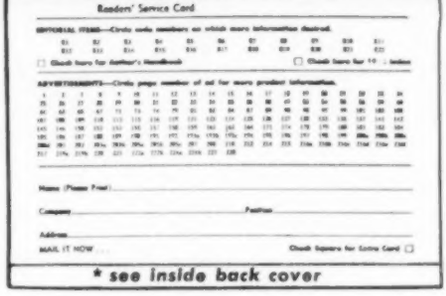
W-K-M Appoints Tableman New Assistant in Marketing

Glen A. Tableman has been appointed assistant to the vice president of marketing of W-K-M, Division of ACF Industries, Incorporated. Tableman, who will assist B. J. Gross, will be in charge of special projects for the Marketing division.

Joining the company in 1949 as a service man, Tableman was promoted to sales and service representative and in 1951 was made district sales manager of the Dallas-Fort Worth area.

Tableman will make his home in Houston. W-K-M manufactures valves and fittings for the oil, gas and general industry.

use these
READERS' SERVICE CARDS*
for more information



* see inside back cover

WANTED TO BUY

Used—10¾" OD - 12¾" OD - 14" OD and 16" OD - Plain End Line Pipe. Any amount—any location.

CENTRAL PIPE & SUPPLY CO.

P. O. Box 1466 — Phone SH 4-7404
Lubbock, Texas

For Sale:

3-T D-7 CATERPILLAR TRACTOR equipped with Cat. hyd. bulldozer, Hyster towing winch, oil clutch, 20 in. tracks, crankcase guard, pull hook, electric starter on starting motor, lights, will sell without winch; perfect condition used only 1200 hours. Price $16,000.00, no down payment, pay for by the month.

H-D9X ALLIS CHALMERS BULLDOZER equipped with crankcase guard, pull hook, and Carco model F towing winch, used 2000 hours, perfect condition. Will sell without winch, price $7,000.00. Pay for by the month.

LJSW MACK TANDEM TRUCK TRACTOR equipped with #70 Tulsa winch, 36 in. 5th. wheel, rolling tail board, 707A engine, air brakes and 26 ft. Montgomery tandem oilfield trailer, very clean unit, will sell for $10,000.00 and include a State wide oilfield hauling authority for the State of Illinois, pay for by the month.

Contact TOMMY H. PAYNE
Ewing, Ill. Phone 2307

TRY A CLASSIFIED AD IN PIPE LINE INDUSTRY

Idle Equipment –
Idle Dollars!
Sell It Through a Classified Ad in Pipe Line Industry.

**QUICK
ECONOMICAL
RESULTFUL**

Need Engineers – Technical Personnel? A Classified Ad will get them for you.

What's New in Equipment

for the Pipe Line Industry

Pressure Relief Valves

The Kinzbach Tool Company has announced two new pressure relief valves known as Models 412 and 414. The difference between them lies only in the method of pilot valve loading and type of pilot valve. The new valves meet the need for a simple and accurate means of relieving excessive pressures at strategic points in pressure systems.

The line pressure is utilized for opening and closing these valves with opening pressure preset by application of dead weight or spring load. They are designed for instantaneous opening to full capacity and for automatic reseating with no chatter or wire-drawing at seat. These valves can be functionally tested at any pressure by hand lifting the pilot stem which operates them; opening pressure can be set accurately without flowing main valve. There are only two moving assemblies and all elements of the valve are easily accessible for maintenance and inspection. The stem, guide, seat and spring are of stainless steel.

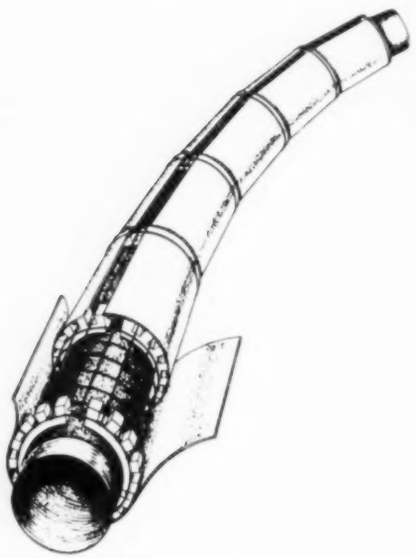
These valves are suitable for operation at temperatures up to 300° F.; on special order 400° F. valves are available. The Kinzbach Models 412 and 414 are made with either single or double outlet valves.

Model 412 denotes a ball seated pilot valve, usually dead weight loaded, but it may be spring loaded. The seating elements are a hardened stainless steel seat into which a hardened stainless steel ball is held by the pilot stem. When the force under the ball equals the force of the weights or the spring force, the pilot opens, causing the main valve to open. After the pressure in the protected system has bled down approximately 15 percent, the ball is forced down on the seat and the main valve then closes.

Model 414 denotes a simple flat seated pilot valve. Usually the pilot valve is spring loaded, but it may be dead weight loaded. The seating elements are a hardened stainless steel seat and a hardened stainless steel disk.

(This item supplements Kinzbach Tool Co., Inc., data on pages 2789-2808 of the Composite Catalog, 21st Edition.)

For more data, circle **No. E1** on Readers' Service Card, last page this issue.



Coating Process

A new type of concrete coating process for use on pipe line pipe from 30 inches down to 4 inches outside diameter utilizing pre-prepared and sacked material weighted to customer specifications is now available from Mallard & Hinkle.

Carefully designed and engineered wrap-around forms with reinforcing mesh and banding material, combined with a special spacer form arrangement, are components of this concrete coating process called "Form-Crete."

The materials for the process are offered on either a "Do-It-Yourself" rental basis with weighting material supplied pre-sacked—or the whole service is available direct from the supply company.

The "Form-Crete" process is said to be an easier way to protect and weight pipe. The pouring mix, which is preportioned and sacked on a standard basis for various weights required, features uniformity of quality control, minimum of labor and supervision required, elimination of material loss and possibility of restorage of surplus material.

For more data, circle **No. E2** on Readers' Service Card, last page this issue.

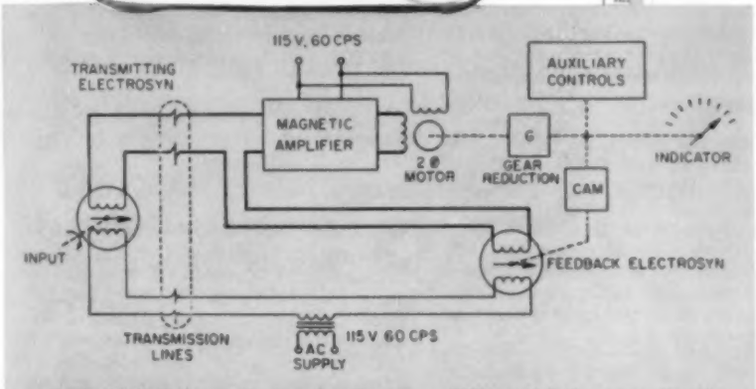
ElectroSyn System

Norwood Controls, Unit of Detroit Controls Corporation, has introduced a new ElectroSyn system to the natural gas, petroleum and chemical processing industries.

ElectroSyn is a non-electronic signal generator system for measurement, indication, transmission and control of a variety of process variables such as pressure, differential pressure, flow, liquid level, temperature. The system can be installed and then enlarged upon to meet facility expansion. If only local indication of pressure at a few points in a pipe line is required, the basic ElectroSyn system yielding only pressure indications may be installed. If it is desired later to bring information into a remotely located control station, an analog-digital converter and other necessary equipment can be added to the basic system.

True null balance is said to assure ElectroSyn's degree of accuracy. Unlimited life is provided by electromagnetic transducers and magnetic amplifiers. The system is composed of three basic components: a signal transmitter (transducer), a power unit (magnetic servo amplifier)

ElectroSyn Pressure Transmitter Model 501



Basic Null-Balance System for Pressure, Differential Pressure, Level

Basic system consists of signal transmitter, magnetic servo amplifier, null-balance indicator. (No electron tubes or slide wires.)

In measuring pressure the Model 501 transmitter utilizes a twisted bourdon tube as the pressure sensing element. This tube converts the pressure into shaft rotation of the ElectroSyn, a rotary differential transformer. Output from the ElectroSyn is an a-c voltage exactly proportional to the measured pressure.

Copyright 1957 Detroit Controls Corp.

HIGHer reliability

LOWer maintenance

- *pressure*
- *differential pressure*
- *flow*
- *level*
- *temperature*

ELECTROSYN SYSTEM

ElectroSyn is a highly flexible, extremely rugged electro-magnetic system for a wide range of applications in the chemical processing, atomic power, natural gas and petroleum transmission fields. It is designed to measure, indicate, record (including analog to digital conversions), or control pressure, differential pressure, flow, liquid level, temperature.

Leading pipeline companies are using ElectroSyn systems for remote indication and data handling of pressures and flows because of system's reliability, flexibility and the fact that it can withstand a static overload of 300% of rated pressure for a 1% zero shift. For complete information write for Technical Bulletin B257.

NORWOOD CONTROLS

UNIT OF DETROIT CONTROLS CORPORATION

931 Washington Street, Norwood, Mass.

NORWOOD CONTROLS

See ElectroSyn System in operation at PIEA-PESA Show, Booths 64 - 67, Shamrock Hotel, Houston - April 16 - 18

Here's the Fast Easy Way to Anchor Pipelines

No heavy equipment to haul. Cuts costs to a fraction.

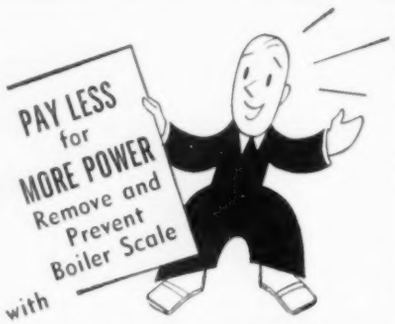
Chance Pipe Line Screw Anchors and Brackets greatly simplify pipe line anchoring, compared to other methods, and save many dollars in pipe line construction.

Chance Pipe Line Screw Anchors can be installed in pipe line ditches without extra digging. Using a power wrench the operator merely guides the anchor in place. The tool does the work.

Can be installed in the ditch without extra digging.

Write for catalog showing oil industry applications of Chance Earth Anchors.

A·B·CHANCE CO·
CENTRALIA, MISSOURI
TORONTO, ONTARIO, CANADA



SAND-BANUM
PURE COLLOIDAL CONCENTRATE

Ounces Only Once a Week Automatically Result in More Power, Less Fuel, Longer Equipment Life.

•

For ALL Radiator Cooling Systems—Stationary or Mobile

SAND-BANUM SPECIAL
IN HANDY TABLETS

Maintains the cooling system free from rust, crust, sludge, dirt, oil, grease and lime; any and all clogging matter.

Stocked by Leading Supply Houses
Gulf Coast District Representatives
WESTERN SAND-BANUM CO.
1717 Chenevert Street, Houston, Texas

AMERICAN SAND-BANUM CO.
ESTABLISHED 1926
MEADOW BROOK NATIONAL BANK BUILDING
FREEPORT, NEW YORK

and a null-balance indicating receiver.

In measuring pressure, differential pressure or flow, the signal transmitter (by means of a twisted Bourdon tube for pressure or bellows for differential pressure and flow) converts the process variable into a shaft rotation of the ElectroSyn, a rotary differential transformer. Output from the ElectroSyn Transmitter is an a-c voltage exactly proportional to the variable (12 volts full scale).

When measuring temperature, the signal transmitter is simply a temperature-sensitive resistor and the (feedback) ElectroSyn is replaced by a precision potentiometer.

For more data, circle **No. E3** on Readers' Service Card, last page this issue.

Signaling Package

A single-unit console providing complete selective calling facilities for land-mobile two-way radio base station installations has been announced by Motorola, Inc., Communications & Industrial Electronics Division.

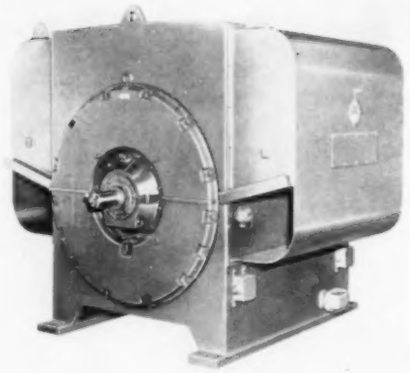
Recently added to the Motorola "Quik-Call" selective signaling line, the new console combines all tone signaling elements, including tone generator, timer, power supply and code selector, in a single package. Simplified with respect to installation, adjustment and operation, the console can be added to any existing two-way radio system, regardless of make or model.

With the addition of selective calling facilities, a mobile receiver in a two-way radio system responds only to calls specifically directed to it, and is silenced to all other traffic on the channel. "Quik-Call" signaling can be used to remotely operate bells, lights, sirens or other devices. Units equipped with decoder elements are individually selected by transmitting a code consisting of two dual audio tones. Simultaneous selection of several units is achieved with a single two-tone code.

For more data, circle **No. E4** on Readers' Service Card, last page this issue.

Weather-Protected Motor

Allis-Chalmers Manufacturing Company has announced a new weather-protected motor (Type FOD) for non-hazardous outdoor installations. Available from the company's Norwood Works in ratings of 250 horsepower and larger, the new motor is built into a rigidly constructed fabricated steel frame equipped with two removable air ducts. Capsule mounted sleeve bearings are supported by cast iron bearing brackets which close the end of the frame. The frame houses a removable pre-



wound stator assembly unit. Stator leads, completely enclosed and protected, are brought to a diagonally split cast iron conduit box.

The steel removable air intake ducts have openings at each end. Their design minimizes the effects of high velocity winds and minimizes the entrance of entrained moisture and particles into the electrical parts of the machine. The motor's contour provides natural drainage. Gutters above the air intake openings prevent water from falling into the air intake stream.

The air intake ducts are equipped with protective screens just above the intake openings. Dry-type washable air filters are optional and can be installed through the filter access hole in the side of the air duct. Air discharge openings in the bottom of the frame are baffled and screened to bypass high velocity winds under the motor. Modifications of the air intake openings are possible to meet certain specific requirements.

Immersion type space heaters for use during periods when a machine is inactive are standard equipment on the weather-protected motor. In addition, bearing temperature relays, bearing temperature detectors, stator temperature detectors and stator winding thermoguards are available for use in connection with the motor.

(This item supplements Allis-Chalmers Manufacturing Company data on pages 896-901 of the Composite Catalog, 21st Edition.)

For more data, circle **No. E5** on Readers' Service Card, last page this issue.

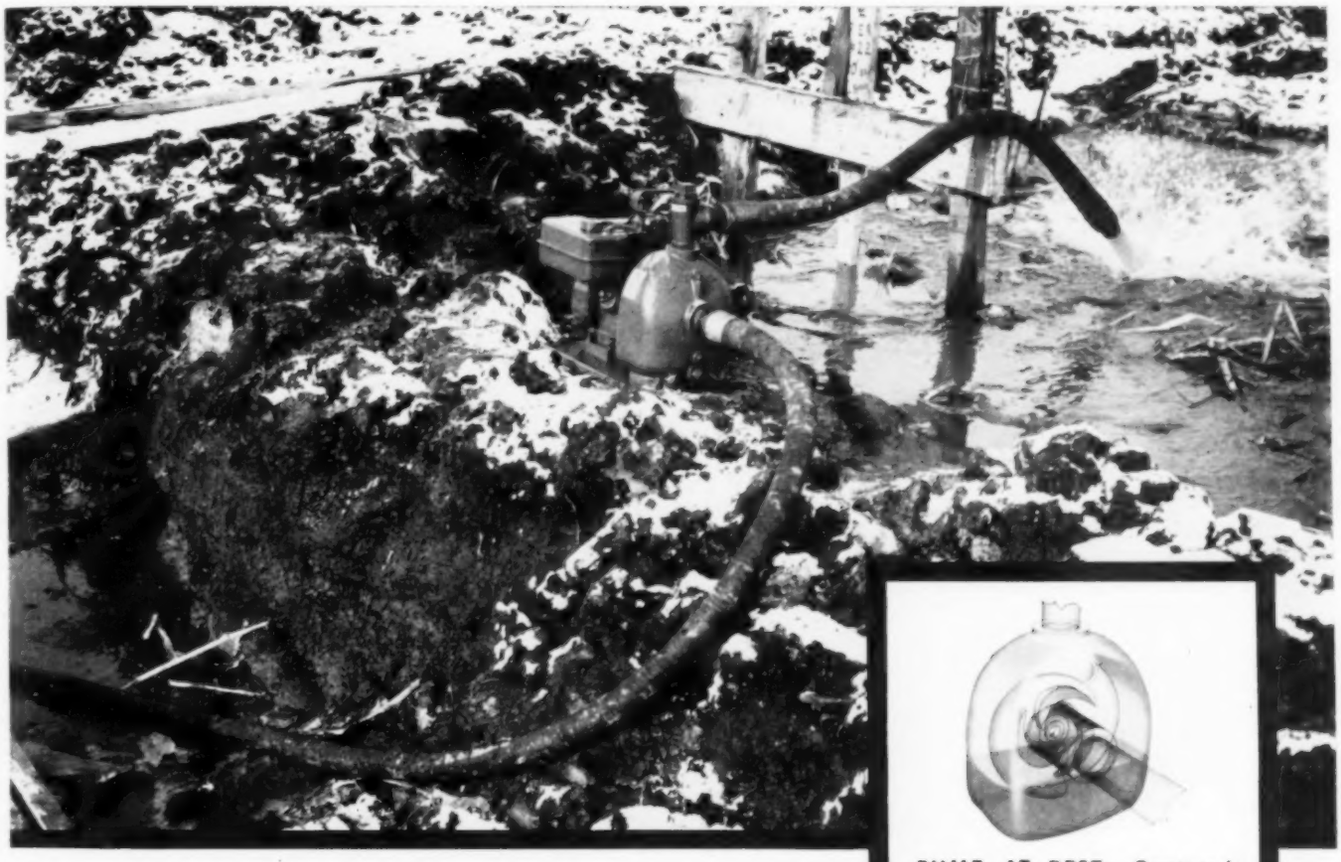
Gas Compressor Units

Southern Engine and Pump Company presented its packaged gas compressor units for their first showing. Le Roi engines and Worthington compressors are used in the packaged gas compressor units.

Custom designed and engineered, these units are assembled in Southern Engine's Houston shops, utilizing 49 years experience with engines and compressors in the oil and gas industry. More working area is available to the service man by placing the horizontal separator and most of the piping within the base. Flush-mounted grating is used for decking. The engines range from 50 horsepower to 600 maximum horsepower; compressors have either 9-inch, 11-inch or 13-inch strokes with various cylinder sizes. Units may be furnished with a central cooler for engine cooling, gas inter and after cooling and compressor cooling.

For more data, circle **No. E6** on Readers' Service Card, last page this issue.

See the New Gorman-Rupp "80 Series" Pumps at Your Nearest Distributor!



SHOW STEALER!

Here's an exciting new line of Gorman-Rupp centrifugal pumps that prime . . . with important features never before offered to pump users. Straight-in suction! No check valve! These pumps never fail, never quit. Nor will solids foul them*.

The new Gorman-Rupp design delivers pumped liquid direct to the eye of the impeller, increasing capacity, efficiency and lift. Simpler. Lighter in weight. Fewer parts. Sizes 1½", 2" and 3".

Featured in a high-tower priming demonstration at the Road Show in Chicago!

*Provided standard equipment supplied with pump is used.

PUMP AT REST—Captured liquid retained for priming. Note absence of the usual check valve.

PRIMING ACTION—Entrained air (B) escapes at (A) to be discharged. Priming liquid returns (C) to entrain more air.

PUMPING ACTION—Straight-in suction voids entrance restrictions. Water enters direct to the eye of the impeller.

THE GORMAN-RUPP COMPANY

305 Bowman Street • Mansfield, Ohio

Mid-Continent & Gulf Coast Oilfield Representative

HENRY H. PARIS DISTRIBUTOR, INC.

1125 Rothwell Street, Houston, Texas

NOW *a Modern Fittings Package*

one more reason for specifying
W-S FORGED STEEL FITTINGS

W-S Forged Steel Fittings are now being shipped in strong, lightweight fiberboard cartons designed to make purchasing a pleasure. Shipments are made up of unit cartons packaged inside a larger reinforced carton. It's easy...and advantageous to order your fittings in packaged quantities.

Here are additional advantages of the new W-S package:

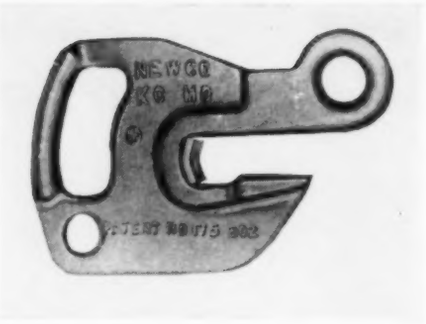
1. Compact and easy to handle.
2. Ideal for neat, efficient stacking on warehouse and stockroom shelves.
3. Sealed against dust and moisture.
4. Contents clearly marked on outside face of each carton, readily visible for prompt identification.

The new W-S package is only one of many reasons why W-S Forged Steel Fittings are the most widely accepted by industry.

Don't forget, too, W-S carbon steel fittings have the additional protection of their new blue synthetic coating. For detailed information on packaged lots ...and for a copy of our new fittings catalog, write today to W-S Fittings Division, H. K. Porter Company, Inc., Roselle, N.J.

Sold Through Leading Distributors

HKP W-S FITTINGS DIVISION
H. K. PORTER COMPANY, INC.



Pipe Hook

The Newco Manufacturing Company has designed a new potential pipe hook for handling thin wall beveled edge oil or gas pipe. The new hook has a one-inch throat opening and a wide flange lip to give more bearing surface. A soft brass insert has been placed in the neck so no damage can be done to the beveled edge. This new hook is a steel casting with 79,000 pounds per square inch tensile, weighs 8½ pounds and has a rated safe working load of 8500 pounds.

For more data, circle **No. E7** on Readers' Service Card, last page this issue.

Channel Guard

General Electric Company has announced a new tone squelch system designed to relieve two-way radio users in the petroleum industry of the necessity of listening to transmissions of other operators sharing the same channel.

Called the Channel Guard, this product combines advantages of both tone squelch and conventional noise squelch. It provides one way or two way protection against unwanted calls, noise and disruptive performance. The automatic monitoring feature will enable petroleum users to maintain high standards of channel courtesy while obtaining relief from interference caused by co-channel users.

The system will be helpful to petroleum operators employing more than one station to cover large geographical areas. It is possible to equip one area at a time and still be able to dispatch units to another area in the system during an emergency. In such cases, the tone-equipped vehicles can disable the tone squelch feature and operate effectively with standard noise-operated squelch.

Channel Guard may be added to General Electric Progress Line transmitters and receivers at the user's option. It is available in kit form for easy installation in Progress Line equipment now in service in the field. A benefit to existing users is that Channel Guard does not obsolete equipment currently serving in the industry. It is unnecessary for users to trade in their current set to procure Channel Guard's protection.

(This item supplements General Electric Company, Electronics Division, data on pages 1974-1975 of the Composite Catalog, 21st Edition.)

For more data, circle **No. E8** on Readers' Service Card, last page this issue.

WORKING ON THE HEELS OF THE LOWER-IN CREW a one-man-operated Cleveland 190 helped to keep this United Gas pipeline job moving along, leaving no open trench at the end of any day's work. A report from Fowler-Tatom Pipeline Contractors states, "The Cleveland 190 backfilled trench almost as fast as a man can walk." Where trenches were water-filled the 190 tied down pipe then doubled back to complete the fill and finished it off with a neat clean-up job. Much of the 16-mile line from the Chocolate Bayou field to the main line near Webster, Texas, cuts through rice-growing farmlands, so the 190 had to pull down big heavy spoil banks of wet sticky gumbo much of the way.

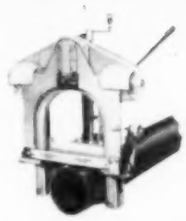
THE CLEVELAND TRENCHER COMPANY, 20100 St. Clair Avenue, Cleveland 17, Ohio

(Advertisement)

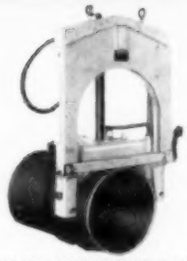
WACHS *Portable*

POWER AND MANUAL PIPE CUTTERS

2" TO 72" CAPACITY

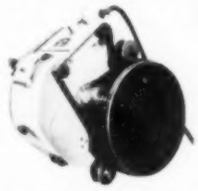


WACHS GUILLOTINE SAW
2" to 8" Capacity
Electric or Air Drive



"BIG" GUILLOTINE SAW
10" to 16" Capacity

WACHS CHICAGO



WACHS NATIONAL SAW
"The milling machine on wheels"
Cuts 10" to 72" Pipe

WACHS STRICKLER
RATCHET CUTTER
"Lathe Type Cuts"
5 sizes—2½" to 24" Capacity

Write for descriptive bulletins

THE E. H. WACHS COMPANY

Manufacturers of Engines, Valves and Machinery since 1893

1525 NORTH DAYTON STREET • CHICAGO 22, ILLINOIS

KEEP PURE DRINKING WATER ALWAYS HANDY

insist on the highest quality

Gotkool

water cans and coolers

Specify **"GOTKOOL"** the next time you order water cans or coolers. **"GOTKOOL'S"** exclusive construction keeps water cooler . . . fresher . . . purer. Extra wide, snug-fitting, splash-proof top keeps out impurities. Non-leaking, push-button faucets, either extended or recessed flush-mounted. *Buy* **"GOTKOOL"** *at your supply store today.*

GOTKOOL Water Cooler – made in 1½-, 2-, 3-, 5-, 10-, 15-, and 20-gallon sizes with either extended or recessed, flush-mounted faucet. *Note:* 15- and 20-gallon sizes available with extended faucet only.

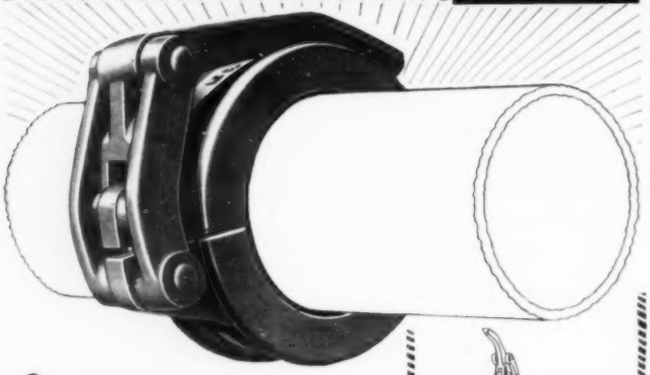
GOTKOOL Water Can – made in 1½-, 2-, 3-, 5-, 10-, 15-, and 20-gallon sizes without faucet.

Insist on the genuine – look for the Blue and Black Label with the name "GOTKOOL" in Red.

H. P. GOTT MFG. CO.

WINFIELD, KANSAS

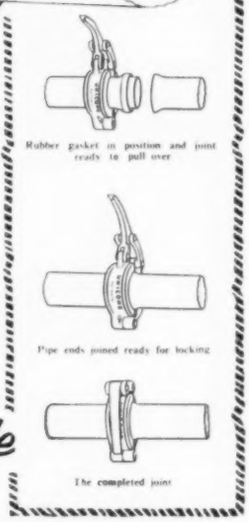
INSTANTANEOUS! JOINTS



A perfect seal in a matter of seconds

For temporary pipe lines 'Unicone' instantaneous joints are recommended. Comprising two parts only, they fasten with a "snap" ensuring a perfect seal in a matter of seconds.

For permanent or semi-permanent pipe lines 'Unicone' bolted type joints are usually employed and can be assembled far more quickly than any flexible joint giving positive anchorage.



Rubber gasket in position and joint ready to pull over

Pipe ends joined ready for locking

The completed joint

'UNICONE' REGD

Flexible Joints for all Pipelines.

leakproof. safe. reliable

THE UNICONE COMPANY LTD.

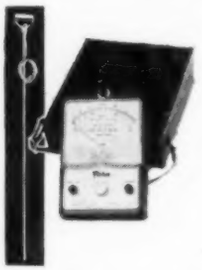
RUTHERGLEN • GLASGOW • SCOTLAND

New Corrosion Control Instruments by Fisher

TRANSISTORIZED
Soil Resistivity Meter

Gives on the spot measurements in ohm/cm³. New ALL ELECTRONIC circuit provides AC for accurate measurements. Includes 4 ft. probe, leather case. TRULY PORTABLE—weighs only 3¼ lbs.

$165.00



5 lbs; 5" x 8" x 4"; complete with leather case.

Portable, Battery-Operated Vacuum Tube MILLIVOLTMETER

- Accurately measures small field potentials to 50 MICROvolts.
- 8 full scale ranges from 0-25 millivolts.
- Accuracy ± 1½% on ALL ranges.
- 10 megohms input resistance AC or DC models

$225.00

SEND FOR FREE CATALOG of 1957 Electronic Instruments

Fisher

RESEARCH LABORATORY, INC.
Dept. PI-1, Palo Alto, California
Geophysical Instruments Since 1932 • Manufacturers of M-Scope Pipefinders

GIVE YOURSELF A BREAK!

with **BrakeSol**

HOLDS PARAFFIN IN SUSPENSION from FORMATION to REFINERY

Now is the time to give yourself a break with BrakeSol and clean the paraffin from your production system. Then keep it clean by setting up a program of constant treating.

FORMATION. Get more production by cleaning up the formation with BrakeSol. Use with frac jobs to get more effective results.

HEATER-TREATER. BrakeSol will allow the use of less heat, thereby increasing the gravity of your oil.

TANKS. Clean up that tank bottom by treating it back into the oil where it can be sold. Equally effective on the largest pipeline tank and the smallest stock tank.

CARMI, ILLINOIS 4-2905
CASPER, WYOMING 2-3453
GREAT BEND, KANSAS 4285
FT. MORGAN, COLO UNderhill 7-6389
HOUSTON, TEXAS HOmestead 5-6648
LOVINGTON, NEW MEXICO 6-5954
NEW IBERIA, LOUISIANA EMerson 9-3498
ODESSA, TEXAS FE 7-7192
ARDMORE, OKLA. 6489
OKLAHOMA CITY, OKLA. VI 3-6629 WH 9-5561

CONTACT YOUR NEAREST BRAKESOL TREATING ENGINEER

Your BrakeSol Treating Engineer can show you the most effective methods of application and how to accomplish all of the above in one simple operation. Make money and save trouble this winter by the use of BrakeSol.

• **Export Distributor: The National Supply Co.**
Export Division 600 Fifth Avenue
New York, New York, U.S.A.

BRAKESOL, Inc.
P.O. Box 9506 Okla. City, Okla.

More comments on this new Handbook:

"... a most practical on-the-job manual for men concerned with pipe line corrosion. We are ordering copies for each of our district engineers."

Pipe Line Corrosion and Cathodic Protection

By MARSHALL E. PARKER

This Handbook is designed as a practical field manual. It presents comprehensive data on Soil Resistivity Surveys, Potential Surveys, Line Currents, Current Requirements, Rectifier Systems, Ground Bed Design, Magnesium Anodes, Stray Current Electrolysis, Interference in Protective Systems, Operating and Maintenance, and Coating Protection and Testing.

An appendix includes technical data on Underground Corrosion, Basic Principles of Cathodic Protection, Properties of Metals and Attenuation Equations.

108 Pages Price $3.00

Address:

Book Department
THE GULF PUBLISHING COMPANY
P. O. Box 2608 Houston 1, Texas

New Equipment Literature

For more data on New Equipment or copies of Catalogs and Literature reviewed in this issue, use the Reader Service postcards just inside the back cover and facing the Advertisers Index. Simply circle code numbers of items desired—sign and mail card.

Protective Coatings

A new two color Polyken protective coatings catalog has been issued by The Kendall Company, Polyken Sales Division. Polyken coatings are used in protection of underground pipe lines and in above ground installations where corrosive agents are a threat to machinery, piping and fixtures. The tape method of application to pipe is fully explained in this new bulletin. Preparation of surfaces and how they are coated and inspected also are described. Case histories of successful applications of the Polyken method are cited.

To get a copy, circle **No. E9** on Readers' Service Card, last page this issue.

Batteries

Bulletins are now available from C & D Batteries Inc. on the C & D PlastiCell and PlastiCal batteries used for microwave communication applications. Requiring virtually no maintenance, the batteries are engineered to provide instantaneous emergency standby power in unattended out-of-the-way microwave transmission and relay stations. PlastiCell is the company's standard type lead-antimony battery, while PlastiCal represents the long-life lead-calcium battery built to last for 25 years.

To get a copy, circle **No. E10** on Readers' Service Card, last page this issue.

Two-Way Radio

Quantity production has begun on an all-new progress line 450 mc 2-way radio by General Electric. A new brochure describing its operation and advantages has been prepared for distribution. In addition, a brochure is available on the quadriphase microwave for the petroleum industry, a modern electronic tool being used by industry as a means of achieving instant control of men and equipment everywhere within an organization.

To get a copy, circle **No. E11** on Readers' Service Card, last page this issue.

Electrode Data

A new electrode data book has been prepared by National Cylinder Gas Company. It includes information on AWS-ASTM arc welding electrode specifications; how to estimate electrode consumption; summary of welding symbols; factors in selecting electrodes and other data of interest to users of arc welding.

To get a copy, circle **No. E12** on Readers' Service Card, last page this issue.

Valve Lubricant

A new version of Rockwell Manufacturing Company's bulletin on "Lubricants for Rockwell-Nordstrom Valves" provides more detailed lubricant selection data, including information about 80 new lubricants.

Four new lubricants not listed in previous bulletins are described in detail. These include No. 555, a general purpose lubricant for hydrocarbon liquid and gas services; No. 921 for strong acids and alkalies, alcohols, glycerine and glycols, amines, aqueous solutions, hot water and hot asphalt; No. 860 for natural gas transmission line services; and No. 833 for aviation gasoline, jet fuel, hydrocarbon and aromatic solvent services.

To get a copy, circle **No. E13** on Readers' Service Card, last page this issue.

Automatic Controls

The Mercoid Corporation has released its latest catalog of automatic controls listing more than 100 items. All controls feature hermetically sealed mercury contacts. The catalog lists controls for single stage pressure, two-stage pressure, differential pressure, single stage temperature, two-stage temperature, liquid level and mechanical movement. Also shown are relays and a complete line of mercury switches. Each control, with accompanying description, specifications and engineering data can be located by a dual index included in the catalog.

To get a copy, circle **No. E14** on Readers' Service Card, last page this issue.

Oil Filters

The Hilliard Corporation has announced a new series of oil filters. Designated the "R" series, the new filter features a throw-away cartridge and easy service of the simplified three-piece construction. The R series Hilco Hyflow oil filters are designed for filtration of lubricating and fuel oils used in internal combustion engines, for oil bath air filters and for filtration of various types of industrial oils, fuel oils, solvents and coolants used in chemical process industries. Bulletins on specifications, flow rate etc. are available.

To get a copy, circle **No. E15** on Readers' Service Card, last page this issue.

Circle numbers on Readers' Service Cards on last page

IF YOU BUY OR SPECIFY CONTROLS

MERCOID®
CATALOG No. 857

Will help make your selection easier

WRITE FOR YOUR FREE COPY

CONTENTS:

CONTROLS FOR PRESSURE—
DIFFERENTIAL PRESSURE—
TWO-STAGE PRESSURE—
TEMPERATURE—
TWO-STAGE TEMPERATURE
LIQUID LEVEL
FLOAT OPERATION
LEVER ARM OPERATION

CASE STYLES TO MEET VARIOUS REQUIREMENTS
INDOOR (General Purpose)
OUTDOOR (Weather Resistant)
HAZARDOUS LOCATIONS (Explosion-proof)

••• ALL MERCOID CONTROLS INCORPORATE SEALED MERCURY CONTACTS •••

ASK FOR CATALOG NO. 857-P

THE MERCOID CORPORATION
4201 Belmont Ave., Chicago 41, Ill.

Advertisers' Index

• Dot preceding name of advertiser indicates that detailed data on products and services of the firm will be found in current 21st (1955-1956) edition of The Composite Catalog of Oil Field and Pipe Line Equipment

A

Acme-Newport Steel Co. 29
• The Aerotex Corp. 76
The Air Preheater Corp. 21
• Alco Products, Inc. 77
John Allen & Sons (Oxford) Ltd. 82
American Sand-Banum Co. 116b
American Telephone & Telegraph Co. 32
Anaconda Wire & Cable Co. 93

B

• Borg-Warner Corp. 99
Braden Winch Co. 108
• Brakesol, Inc. 120b
The Bristol Co. 79
• Broderick & Bascom Rope Co. 10
• Bucyrus-Erie Co. 90
• Byron Jackson Pumps, Inc.
Division Borg-Warner Corp. 99

C

• Caterpillar Tractor Co. 8, 106
A. B. Chance Co. 116a
• Clark Bros. Co. 18
Classified Advertising 113
The Cleveland Trencher Co. 119a
• The Colorado Fuel & Iron Corp. 19
Cosasco Division
Perfect Circle Corp. 103
• Crane Co. 84
Crane Packing Co. 7
Crutcher-Rolfs-Cummings, Inc. 102

D

Darling Valve & Mfg. Co. 9
De Laval Steam Turbine Co. 70-71
Detroit Controls Corp. 115
• Dollinger Corp. 14
• Dresser Industries, Inc. 18
The Duriron Co. 68

F

Fish Engineering Corp. 72
• Fisher Governor Co. 26
Fisher Research Laboratory, Inc. 120c
• Flexitallic Gasket Co. 27

G

• Gaso Pump & Burner Mfg. Co. 56
• The Gorman-Rupp Co. 117
• H. P. Gott Mfg. Co. 119c
Gulf Oil Corp. 83
• The Gulf Publishing Co. 91b, 120d

H

H & L Tooth Co. 126
The Hilliard Corp. 111

I

• Ingersoll-Rand Co. 81
• International Harvester Co. 16-17

J

Jaeger Machine Co. 109
• Johns-Manville Corp. 94
• Jones & Laughlin Supply Division 125

K

Kaiser Steel Corp. 7
Kern Instruments, Inc. 10
• Kinzbach Tool Co. 9

L

• Link-Belt Speeder Corp. 1
• Lone Star Steel Co. 5

M

• Magnetrol, Inc. 8
• F. H. Maloney Co. 8
Marine Gathering Co. 1
• C. A. Mathey Machine Works, Inc. 1
• The Mercoid Corp. 12
Midwest Piping Co. 2

N

Norwood Controls
Unit Detroit Controls Corp. 11

P

Parsons Co. 74
Tod Pazdral Pipeline Specialties 97
• Peerless Manufacturing Co. 2
• Pelican Supply Co. 122
Perfect Circle Corp. 103
• Perrault Equipment Co. 100
Pipe Line Composite Catalog 46-47
H. K. Porter Company, Inc. 118

R

Rochester Manufacturing Co. 28
• Rockwell Manufacturing Co. 30-31
John A. Roebling's Sons Corp. 63
Royston Laboratories, Inc. 6
The Ruberoid Co. 88
Russell & Stoll Co. 65

S

Shand & Jurs Co. 110
• M. B. Skinner Co. 91a
• A. O. Smith Corp. 22-23
Somerville Construction Co. 122b
Standard Pipeprotection, Inc. 112

T

The Thew Shovel Co. 13

U

The Unicone Co. 120a
• Union Wire Rope Corp. 101
Universal Oil Products Co. 25

V

Valley Manufacturing Co. 122a

W

• W-K-M Manufacturing Co. 20
W-S Fittings Division, H. K. Porter Co. 118
The E. H. Wachs Co. 119b
The Walworth Co. 96
• Wheaton Brass Works 105
• Wickwire Spencer Steel Division
The Colorado Fuel & Iron Corp. 19
Williams Pressure Service Co. 73
T. D. Williamson, Inc. 78

Y

The Youngstown Sheet & Tube Co. 11

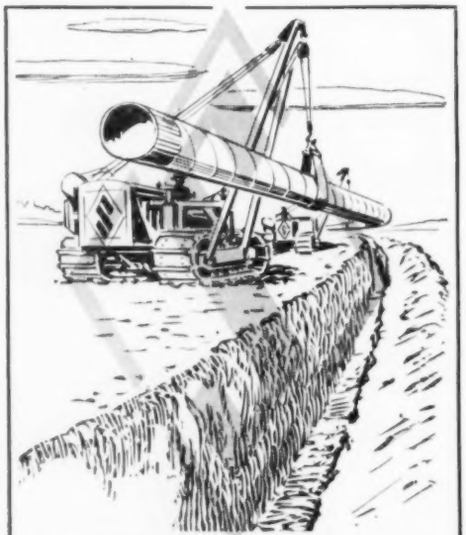
AVAILABLE NOW
LIGHTWEIGHT
STEEL PIPE

Available in 6", 6⅝", 8", 8⅝", 10" and 10¾" diameters; 10, 12 and 14 gauge; 20, 30 and 40 ft. lengths.

Valley high grade, butt welded steel pipe is produced under rigid standards in the Midwest's first continuous steel pipe mills. Lightweight for fast, economical installation, plain or asphalt coated, choice of joints. Ideal for use in water and gas lines, irrigation systems, air-conditioning and heating conduit, well casings, heat exchangers, etc.

For full information write to:

Steel Pipe Division
Valley Mfg. Co., Valley, Nebr.



Repeat business proves best that

SOMERVILLE

has what it takes to handle your next pipeline job

SOMERVILLE CONSTRUCTION CO.
Ada, Michigan

SIGN OF SATISFACTION
TRANSMISSION LINES
DISTRIBUTION SYSTEMS

NOTICE: Specify **PELCO** Welding Saddles

No change except the corporate name. We still have the same ownership, same management, same address, same telephone, and use the same 45 years of experience to render the same service under the same trade name—"PELCO."

PELICAN SUPPLY CO. INC.

P. O. Drawer 1108 Shreveport (84), La.
SEE YOUR NEAREST SUPPLY HOUSE

use these

READERS' SERVICE CARDS

for more information

Here is a quick, convenient way

to get more information on New Equipment and Literature reviewed in the editorial columns and on products and services advertised in this issue of PIPE LINE INDUSTRY:

1. For more data on New Equipment, Catalogs and Literature **reviewed in the editorial columns,** circle on the card below the **Code Number** shown in the item itself.
2. For more data on Advertised Products and Services, circle on card the **actual page number** of the advertisement as listed in the **Advertisers' Index** on the preceding page.
3. Then, **print** your name, title, company and complete mailing address and drop the card in the mail. PIPE LINE INDUSTRY'S Readers' Service Department will promptly forward your request to the company concerned. The requested information will then be mailed directly to you.

Quick-Easy

Use these cards to help keep informed on what's new . . . for more job-help information on equipment and services.

•

Postage Will be Paid by Gulf Publishing Company

No Postage Stamp Necessary if Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 7 (Sec. 34.9, P. L. & R.), Houston, Texas

PIPE LINE INDUSTRY Readers' Service Dept.

BOX 2608

HOUSTON 1, TEXAS, U. S. A.

Circle code number for more data on "New Equipment" editorial items

Circle page number for more information on ADVERTISED products

PIPE LINE INDUSTRY Readers' Service Card April, 1957, Issue*

EDITORIAL ITEMS—Circle Code Numbers on which more information desired:

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15

ADVERTISEMENTS—Circle page number of ad for more product information:

2 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
24 25 26 27 28 29 30 31 32 46 47 56 63 65 68 70 71 72 73 74
75 76 77 78 79 81 83 84 85 88 89 90 91a 91b 92 93 94 95 96 97
99 100 101 102 103 104 105 106 108 109 110 111 112 113 115 116a 116b 117 118 119a
119b 119c 120a 120b 120c 120d 121 122a 122b 122c 125 126

Name (Please Print)_____

Company_____ Position_____

Address_____

*MAIL IT NOW — APRIL ISSUE CARD EXPIRES JUNE 30, 1957

use these

READERS' SERVICE CARDS

for more information

Here is a quick, convenient way

to get more information on New Equipment and Literature reviewed in the editorial columns and on products and services advertised in this issue of PIPE LINE INDUSTRY:

1. For more data on New Equipment, Catalogs and Literature **reviewed in the editorial columns,** circle on the card below the **Code Number** shown in the item itself.

2. For more data on Advertised Products and Services, circle on card the **actual page number** of the advertisement as listed in the **Advertisers' Index** on the preceding page.

3. Then, **print** your name, title, company and complete mailing address and drop the card in the mail. PIPE LINE INDUSTRY'S Readers' Service Department will promptly forward your request to the company concerned. The requested information will then be mailed directly to you.

PIPE LINE INDUSTRY Readers' Service Card **April, 1957, Issue***

EDITORIAL ITEMS—Circle Code Numbers on which more information desired:

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15

ADVERTISEMENTS—Circle page number of ad for more product information:

2 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
24 25 26 27 28 29 30 31 32 46 47 56 63 65 68 70 71 72 73 74
75 76 77 78 79 81 83 84 85 88 89 90 91a 91b 92 93 94 95 96 97
99 100 101 102 103 104 105 106 108 109 110 111 112 113 115 116a 116b 117 118 119a
119b 119c 120a 120b 120c 120d 121 122a 122b 122c 125 126

Name (Please Print)_____

Company_____ Position_____

Address_____

*MAIL IT NOW . . . APRIL ISSUE CARD EXPIRES JUNE 30, 1957

Circle code number for more data on "New Equipment" editorial items

Circle page number for more information on ADVERTISED products

Postage Will be Paid by Gulf Publishing Company

No Postage Stamp Necessary if Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 7 (Sec. 34.9, P. L. & R.), Houston, Texas

PIPE LINE INDUSTRY Readers' Service Dept.

BOX 2608

HOUSTON 1, TEXAS, U. S. A.

Quick-Easy

Use these cards to help keep informed on what's new . . . for more job-help information on equipment and services.

J & L recognizes a difference in
PLUG VALVES

J&L recognizes — intelligently — a difference in all valves.

There is, definitely, a difference in the quality of *plug* valves.

You expect top performance from special lubricated plug valves recommended by J&L Supply for engineered installations.

But you also get top performance from plug valves stocked by your J&L store for less exacting requirements.

Custom-fitting the valves for *your* job is only one example of J&L Supply service. Desirable differences in Walworth Plug Valves add up to important economies for J&L customers.

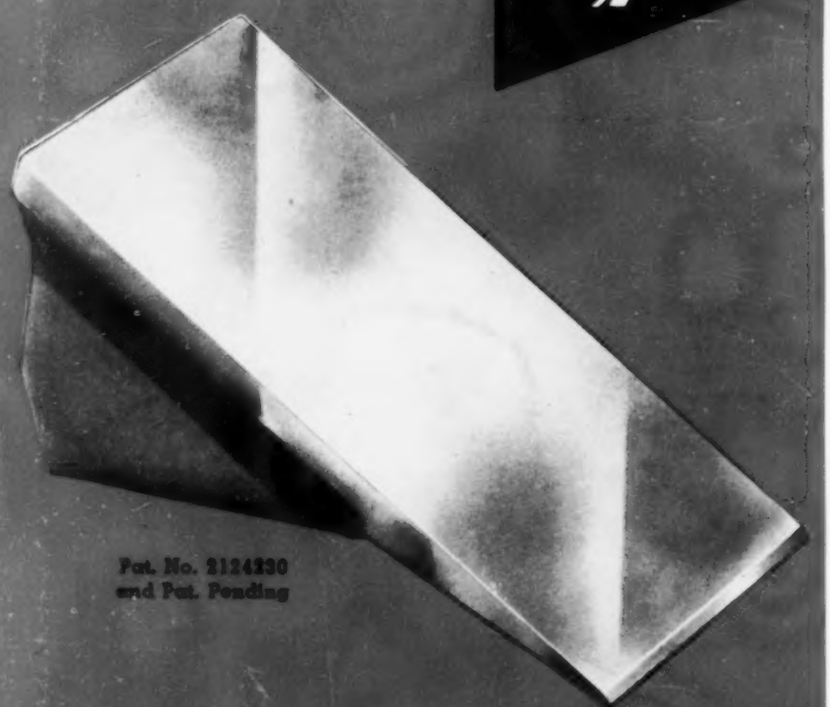
Jones & Laughlin

SUPPLY DIVISION – Tulsa

SERVING THE UNITED STATES AND CANADA

26-G

Teeth that really dig



Pat. No. 2124230
and Pat. Pending

MANUFACTURED BY SPECIALISTS OF ROLLED ALLOY STEEL HAMMER FORGED POINTS

H&L

TOOTH CO.

1540 SO. GREENWOOD AVE.
MONTEBELLO, CALIFORNIA